PRELIMINARY
STORM WATER MANAGEMENT PLAN
FOR
QUARRY CREEK
(CT 11-04)

(VESTING TENTATIVE MAP)

Job Number 16483

October 19, 2011
Revised: December 20, 2011
Revised: March 13, 2012
Revised: October 5, 2012

RICK
ENGINEERING COMPANY

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Exp. 06/14

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TABLE OF CONTENTS

Tables:

Appendices:

REVISION PAGE

October 5, 2012

This Preliminary Storm Water Management Plan presents a revision to the March13, 2012 report pursuant to a revised site plan layout. Revisions include the regrading of Lots 5, 10 and 11, the addition of a bioretention extended detention treatment basin in Lot 10, and a slight increase in drainage area in Lot 3.

Rick Engineering Company
Response to City of Carlsbad plan check titled "3rd Review for Quarry Creek Master Plan – GPA 11-09/ZC 11-04/MP 10-01/CT 11-04/SUP 11-04/HMP 11-07/HDP 11-04" dated January 31, 2012

Plan Check Comments #2
March 13, 2012

Comment 25: *Please provide a drainage basin map showing the locations of drainage basins 1 to 4 and its sub-basins mentioned in the SWMP report. The third paragraph on page 4 refers to the exhibit in Appendix E for locations of drainage basins. However, the Storm Water Management Exhibit found in Appendix E includes only the DMAs, IMPs/BMPs but not the drainage basins.*

Response: The Storm Water Management exhibit has been revised to more clearly show the major drainage basins and sub-basins. The drainage basins are color coded and labeled according to the POC to which it discharges.

Comment 26: *The SWMP exhibit in Appendix E must include a summary table that shows the required sizes of each of the proposed IMPs/BMPs, including length, width, orifice diameter, and details of the outlet structures, including mechanism to avoid orifice clogging. A full size SWMP exhibit must be added to the tentative map/site plan.*

Response: The SWMP exhibit has been revised to include a summary table showing the required information as stated above. A full size SWMP exhibit has been included in the tentative map/site plan.

Comment 27: *The points of compliance (POCs) in the SWMP report do not match the POCs in the SCCWRP analysis.*

Response: The POCs in the SWMP have been renamed to better correlate to the POCs in the SCCWRP analysis.

Rick Engineering Company
Response to City of Carlsbad plan check titled "2nd Review for Quarry Creek Master Plan - GPA 11-09/ZC 11-04/MP 10-01/CT 11-04/SUP 11-04/HMP 11-07/HDP 11-04" dated November 28, 2011

Plan Check Comments #1
December 20, 2011

Comment 35: *The pre-project condition for this development must be based on the topography shown on the approved reclamation grading plan DWG 470-5A. Please revise the statement on Page 2 of the SWMP report, stating that the pre-project condition is based on the site topography created from aerial photography dated 2006 by Project Design Consultants.*

Response: Pursuant to a meeting with the City of Carlsbad on December 14, 2011, it was determined that specific to this project, the Hanson Reclamation Condition is a manufactured condition, and not representative of the watershed runoff historically discharged to the downstream channels. In this instance, the pre-project condition is more appropriate to be based on the site topography dated 2006. The Storm Water Management Plan (SWMP) has been updated to include discussion as to the reason it is appropriate to use the historical topography for the pre-project hydromodification analysis as opposed to the mass graded (reclamation) condition topography.

Comment 36: *The discharge point of the Lot 9 bio-retention basin (treatment BMP for portions of Lot 4) appears to be downstream of POC2 (point of compliance 2) as shown on the SWMP exhibits. Please revise location of point of compliance to include all runoffs from the eastern portion of Lot 4.*

Response: The analysis and report have been revised to include an additional POC at the location of the discharge point from the Lot 9 bio-retention basin, labeled EDB 2-4 on the SWMP exhibit.

Comment 37: *On page 10, under identification of receiving waters, it is indicated that an exhibit titled "Hydrologic Unit for Quarry Creek" has been provided in Appendix B. However, Appendix B contains only the HMP applicability determination matrix.*

Response: The SWMP has been revised to include the exhibit titled "Hydrologic Unit for Quarry Creek" in Appendix B.

Comment 38: *On page 18, the table showing treatment BMP sizing shows impervious areas for each drainage management area (DMA). Please provide impervious area calculations. The impervious area calculations must be based on the ultimate land use of each DMA.*

Response: Please refer to Appendix D of the SWMP for impervious area calculations. The impervious area calculations are shown in the table titled "Land Use Combination Parameters – Post-project" and are based on the ultimate land use of each DMA.

Comment 39: *The project uses a 0.5Q2 threshold for SDHM analysis to comply with hydromodification requirements. Page 22 of the SWMP report indicates that a SCCWRP report has been prepared by Chang Consultants to justify the use of the lower flow threshold in the continuous simulation analysis. The City did not receive the SCCWRP report during this submittal. Please include in the next review submittal package.*

Response: Per Chang Consultants, the SCCWRP will be submitted in the next review submittal package.

Comment 40: *The water quality drawdown time calculations were not provided in the SWMP report. Please add drawdown time calculations for each proposed bio-retention basin in the revised SWMP report.*

Response: The SWMP has been revised to include drawdown time calculations for each proposed bioretention extended detention facility. These calculations are included in Appendix C of the revised report.

Comment 41: *Please complete the applicant information and signature block on page 3 of the Storm Water Standard Questionnaire (Form E-34).*

Response: The SWMP has been revised to include a completed signature block on page 3 of the Storm Water Standard Questionnaire (Form E-34).

1. INTRODUCTION

This Storm Water Management Plan (SWMP) summarizes the post-construction storm water requirements for the Quarry Creek project (herein referred to as "the project"). The project is located east of Interstate 5, south of Plaza Drive, and west of College Boulevard in the City of Carlsbad, and boarders the City of Oceanside. See the Vicinity Map at the end of Section 1.0 for the location of the project. The project proposes to prepare previously mass graded lots into developable pads zoned for residential units consisting of medium and high density housing, public use areas including a park and ride, a community facility site and nature education center, and park and open space areas. The first phase of the project includes grading the pads, construction of the major public roads and utilities, and grading of the Low Impact Development (LID) facilities associated with construction of the major roads. The first phase also proposes offsite improvements to the Marron Road Trailhead which consist of replacing the existing road with a vehicular turn-around, trail parking lot, walkway and landscaped areas. This SWMP addresses post-construction storm water management based on the land use zoning, however several of the lots will ultimately be sold to future developers and it will be the responsibility of the future developers to prepare site specific SWMPs.

For the purposes of post-construction storm water quality management, the project will follow the guidelines and requirements set forth in the City of Carlsbad's "Standard Urban Storm Water Management Plan (SUSMP)," adopted January 14, 2011 (herein "SUSMP"). A copy of the City of Carlsbad Storm Water Standards Questionnaire (SWSQ) for the project is located in Appendix A of this SWMP. Based on the SWSQ, the project is a "Priority Development Project." The following Priority Development Project category applies to the project: "Housing subdivisions of 10 or more dwelling units," "Commercial – greater than 1-acre", "Environmentally Sensitive Area (ESA)", "Parking lot", "Streets, roads, highways, and freeways," and "More than 1-acre of disturbance."

In accordance with the Municipal Permit and final hydromodification management plan (HMP) dated March 2011, Section 2 of the SUSMP states that projects subject to Priority Development Project requirements might be required to implement measures so that post-development runoff

rates and durations do not exceed pre-project conditions (hydromodification controls). According to Figure 2-1, HMP Applicability Determination Matrix, in the SUSMP, the Quarry Creek project is subject to the final HMP. Therefore, a hydromodification management strategy has been developed for the project and is discussed in more detail in Section 5.0 of this report. A copy of the HMP Applicability Determination Matrix is located in Appendix B.

In the pre-project condition, storm water runoff from the site discharges to a tributary of Buena Vista Creek as well as directly to Buena Vista Creek and flows westerly to Buena Vista Lagoon and ultimately discharges to the Pacific Ocean. The proposed site will maintain drainage patterns similar to the pre-project condition hydrologic characteristics, therefore storm water runoff from the proposed site will discharge to Buena Vista Creek and flow westerly to Buena Vista Lagoon and ultimately discharge to the Pacific Ocean.

For the purposes of the SWMP the project is defined by five major drainage basins and Points of Compliance (POC). Runoff from four of the drainage basins flows to Buena Vista Creek. Runoff from the fifth drainage basin flows to a tributary of Buena Vista Creek and confluences with Buena Vista Creek downstream of the project. Buena Vista Creek travels in a westerly direction to Buena Vista Lagoon and ultimately discharges to the Pacific Ocean.

The following provides a description of the drainage characteristics for the pre-project and post-project conditions.

1.1 Pre-Project Condition

For the purposes of the SWMP, the pre-project condition is based on site topography created from aerial photography dated September 2006 by Project Design Consultants. The Municipal Permit requires Priority Development Projects to manage increases in runoff discharge rates and durations which are likely to cause erosion, sediment pollutant generation, or other impacts to beneficial uses and stream habitat. Historically, the channels to which the project discharges have been responding to the natural watershed characteristics that existed prior to the site being mass graded. The mass graded condition (Hanson Reclamation Condition) is a manufactured condition which does not accurately represent the watershed that formed the downstream

channels. In order to comply with the intent of the Municipal Permit, the post-project condition should be compared to the natural watershed characteristics to which the receiving channels have been responding. Therefore, in this case it is more appropriate to use the historical topography for the pre-project hydromodification analysis as opposed to the mass graded condition (Hanson Reclamation Condition) topography.

POC-1

Basin 1 consists of the northeastern portion of the project which drains in a southerly direction to Buena Vista Creek. Refer to the exhibit titled "Quarry Creek Pre-Project Land Use Information" located in Appendix D for the location of each drainage basin and Point of Compliance. The drainage basins are labeled according to the POC to which it discharges. Basin 1 discharges to POC 1. In the pre-project condition, Basin 1 is approximately 14.3 acres. Land uses in the basin are comprised of a mining site which consists of undeveloped areas of dirt and grass. There is an existing storm drain that conveys offsite low-flows through Basin 1. The existing storm drain currently includes a low-flow pipe and swale which provide a minor amount of water quality treatment for runoff from an offsite watershed located north of the project.

POC-3-2

Basin 3-2 consists of the northwestern portion of the project which drains in a southerly direction to Buena Vista Creek. Basin 3-2 discharges to POC 3-2. In the pre-project condition, Basin 3-2 is approximately 12.9 acres. Land uses in the basin are comprised a mining site which consists of undeveloped areas of dirt and grass.

POC-3-3

Basin 3-3 is in the southeastern portion of the project which drains in a northerly direction to Buena Vista Creek. Basin 3-3 discharges to POC 3-3. In the pre-project condition, Basin 3-3 is approximately 6.8 acres. Land uses in the basin are comprised of a mining site which consists of undeveloped areas of dirt and grass. There is an existing storm drain that conveys offsite low-flows through Basin 3-3. The existing storm drain currently includes a low-flow pipe and swale which provides a minor amount of water quality treatment for runoff from an offsite watershed located south of the project.

POC-3-7

Basin 3-7 is in the southeastern portion of the project which drains in a northerly direction to Buena Vista Creek. Basin 3-7 discharges to POC 3-7. In the pre-project condition, Basin 3-7 is approximately 2.0 acres. Land uses in the basin are comprised of a mining site which consists of undeveloped areas of dirt and grass.

POC-4

Basin 4 is in the southern central portion of the project which drains in a northerly direction to Buena Vista Creek. Basin 4 discharges to POC 4. In the pre-project condition, Basin 4 is approximately 26.4 acres. Land uses in the basin are comprised of undeveloped areas of dirt and grass.

POC-5

Basin 5 consists of the southwest portion of the project which drains in a southerly direction to an existing open channel that flows westerly and confluences with Buena Vista Creek downstream of the project site. Basin 5 discharges to POC 5. In the pre-project condition, Basin 5 is approximately 7.7 acres. Land uses in the basin are comprised of undeveloped areas of grass.

POC-6

Basin 6 consists of the far southwest end of the project which drains in a southerly direction to an existing open channel that flows westerly and confluences with Buena Vista Creek downstream of the project site. Basin 6 discharges to POC 6. In the pre-project condition, Basin 6 is approximately 5.5 acres. Land uses in the basin are comprised of undeveloped areas of grass.

Please refer to the exhibit titled "Quarry Creek Pre-Project Land Use Information" located in Appendix D for the location of each drainage basin and Point of Compliance. The drainage basins are labeled according to the POC to which it discharges.

1.2 Post-Project Condition

The first phase of the project includes grading the pads, construction of the major public roads and utilities, and grading of the Low Impact Development (LID) facilities associated with major roads being built as part of the first phase of construction. LID facilities have been preliminarily sized for the ultimate condition but may not be constructed as part of the first phase. In the post-project condition, drainage will be conveyed through a network of storm water management features for Priority Development Project LID requirements, water quality treatment, and hydromodification management prior to outletting to proposed storm drain outfalls.

POC-1

Basin 1 is located in the northern area of the project and includes a small area of offsite runoff in addition to runoff from Lot 1, part of Lot 6, portions of Haymar Drive and Private Drive "C". Runoff will be directed to a bioretention extended detention treatment basin which outlets to POC 1. Basin 1 is approximately 14.3 acres. Land uses in the basin are comprised of high density residential and major streets.

POC-3-2

Basin 3-2 is also located in the northern area of the project and includes runoff from Lot 2, part of Lot 6, Lot 11 and Street "B". Runoff will be directed to a bioretention extended detention treatment basin which outlets to POC 3-2. Basin 3-2 is approximately 12.9 acres. Land uses in the basin are comprised of a park, high density residential and major streets.

POC-3-3

Basin 3-3 is located in the southeastern area of the project and includes runoff from Lot 3. Runoff will be directed to a bioretention extended detention treatment basin located northwest of the intersection of Street A and B which outlets to POC 3-3. Basin 3-3 is approximately 7.3 acres. Land uses in the basin are comprised of medium-high residential.

POC-3-7

Basin 3-7 is located in the southeastern area of the project and includes runoff from Lot 7. Runoff will be directed to a bioretention extended detention treatment basin located within Lot 7

which outlets to POC 3-7. Basin 3-7 is approximately 2.0 acres. Land use in the basin is comprised of a community facility site.

POC-4

Basin 4 is located in the southern central area of the project and includes runoff from the eastern portion of Lot 4, Lot 8, Lot 9 and Street "A". Runoff will be directed to a bioretention extended detention treatment basin which outlets to POC 4. Basin 4 is approximately 26.6 acres. Land uses in the basin are comprised of medium-high residential and public use trails and parks.

POC-5

Basin 5 is located in the southwest area of the project and includes runoff from the western portion of Lot 4.. Runoff will be directed to a bioretention extended detention treatment basin located within Lot 5 which outlets to POC 5. Basin 5 is approximately 5.9 acres. Land use in the basin is comprised of medium-high density residential..

POC-6

Basin 6 is located in the far southwest area of the project and includes runoff from Lot 5 and Lot 10. Runoff will be directed to a bioretention extended detention treatment basin located within Lot 10 which outlets to POC 6. Basin 6 is approximately 6.6 acres. Land use in the basin is comprised of medium-high density residential and a public trailhead and nature overlook.

Please refer to the Storm Water Management Plan exhibit located in Appendix E for the location of each drainage basin and Point of Compliance. The drainage basins are color coded and labeled according to the POC to which it discharges.

In the post-project condition, peak flow and duration controls will be provided so as not to exceed pre-project peak flows and durations as required by the Final HMP. There will be a number of storm water management features working to provide peak flow rate and duration controls, including open channel swales and basins. The preliminary estimate of volumes needed for hydromodification and water quality treatment for each drainage basin is provided in Attachment D.

Constraints and opportunities for site design and selection of treatment and flow-control facilities have been identified for the project. The majority of the project consists of type D soil which presents a constraint in the selection of IMPs. Opportunities include utilizing the 50-foot wide building setback and 100-foot wide vegetated buffer zone, non-contiguous sidewalks, open space areas and parks, and incorporating landscape/vegetated areas in the common public use areas of the project. The 50 and 100-foot wide buffer zones present an opportunity as they provide adequate area for the bioretention extended detention facilities while optimizing the site layout.

An integrated LID approach will be utilized to provide a long-term solution to water quality at the project site. This SWMP is also intended to ensure the effectiveness of the BMPs or IMPs through proper maintenance that is based on long-term fiscal planning.

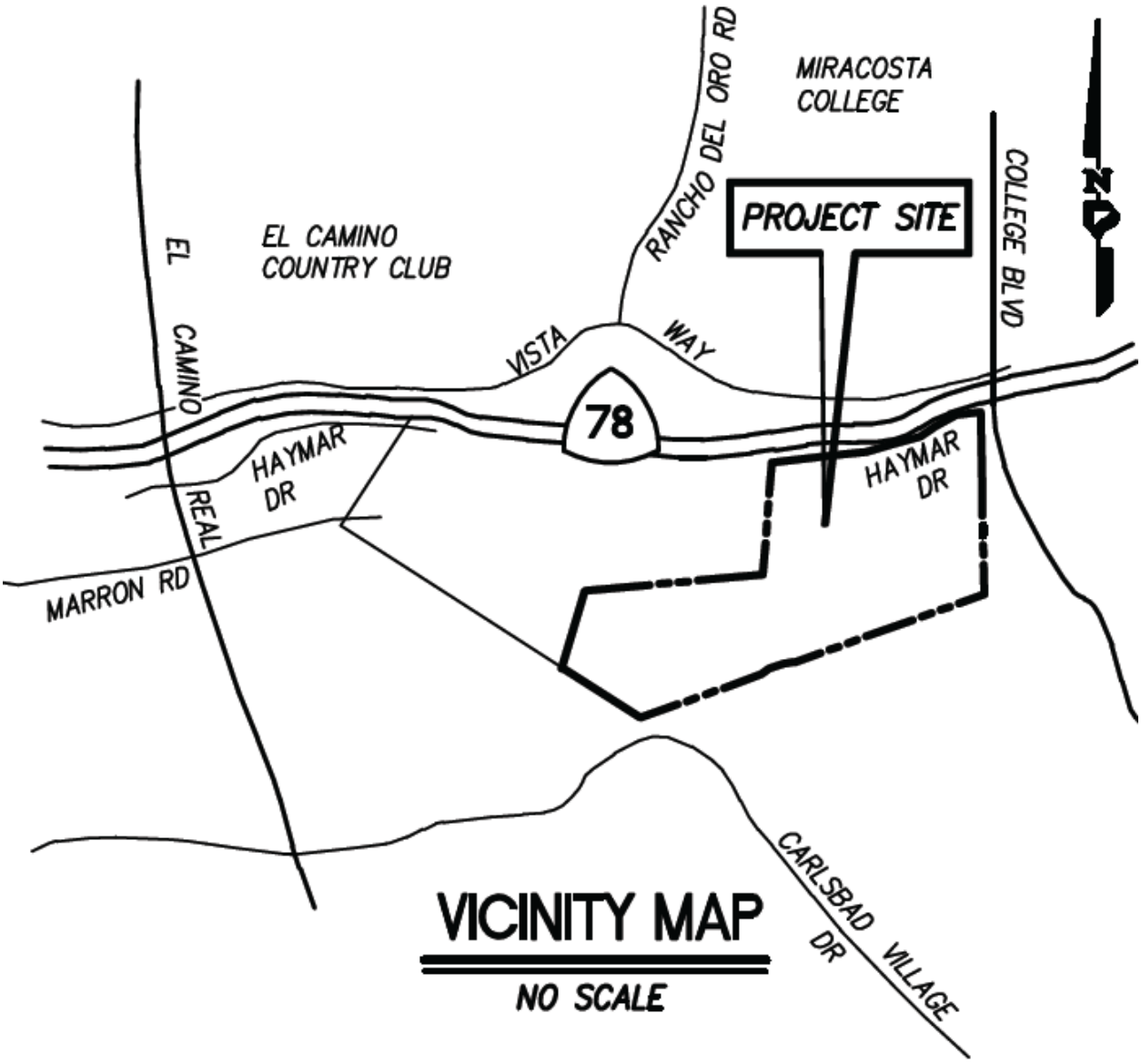
Please refer to the DMA/IMP/BMP exhibit located in Appendix E of this report for locations of the drainage facilities and storm water LID facilities, including tributary drainage areas and flow patterns for the site.

1.3 Offsite Runoff Treatment

Additional storm water treatment of offsite flows will be provided at two locations within the project. The project will continue to provide water quality treatment from two existing low-flow storm drain systems. Per the water quality treatment calculations performed by Chang Consultants, the water quality treatment flow rate is 0.89 cubic feet per second (cfs) discharging to POC-1 from an offsite watershed north of the project, and 0.63 cubic feet per second (cfs) discharging to POC-3 from an offsite watershed located south of the project. The project proposes to utilize two (2) *Bio Clean Water Polisher Up Flow Media Filters* to provide water quality treatment for low-flow stormwater runoff from the offsite basins. Details and specifications are located in Appendix C.

The offsite Marron Road Trailhead improvements consist of replacing the existing road with a vehicular turn-around, trail parking lot, walkway and landscaped areas. The proposed improvements will ultimately decrease the amount of impervious area from the pre-project condition. Pursuant to the County of San Diego SUSMP, if the proposed project decreases the pre-project impervious area and peak flows, then a flow-duration analysis is implicitly not required. Additionally, pursuant to the City of Carlsbad SUSMP, projects limited to resurfacing and reconfiguring surface parking lots and existing roadways, and new sidewalk construction are not subject to additional storm water treatment requirements, however, other requirements, including SWPPP documents/permits and incorporation of appropriate source controls may still apply and will be implemented as applicable.

VICINITY MAP



2.0 IDENTIFICATION OF POLLUTANTS & CONDITIONS OF CONCERN

Section 2 of the City of Carlsbad's SUSMP outlines the procedure for the selection of stormwater treatment facilities. The procedure begins with identification of pollutants with type of project/use, followed by identification of watershed and hydrologic unit basin number and receiving waters, list of impaired water bodies per the latest 303(d) List, and summary of primary pollutants of concern.

2.1 Identify Pollutants from the Project Area

Table 2-1 of the SUSMP, "Anticipated and Potential Pollutants Generated by Land Use Type" identifies general pollutant categories that are either anticipated or potential pollutants for general project categories. The following general project categories listed in Table 2-1 apply to the project: "Detached Residential Development" and "Streets, Highways & Freeways" categories shall be used to describe the anticipated or potential pollutants for the project. Table 2-1 of the SUSMP is reproduced on the following page, with the Priority Development Project categories applicable to the project highlighted.

Table 2-1. Anticipated and Potential Pollutants Generated by Land Use Type

	General Pollutant Categories								
Priority Project Categories	Sediments	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Detached Residential Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P(1)	P(2)	P(1)	X
Commercial Development > 100,000 ft^2	P(1)	P(1)		P(2)	X	P(5)	X	P(3)	P(5)
Heavy Industry /Industrial Development > One Acre	X		X	X	X	X	X		
Automotive Repair Shops			X	X(4)(5)	X		X		
Restaurants					X	X	X	X	
Steep Hillside Development >5,000 ft^2	X	X			X	X	X		X
Parking Lots	P(1)	P(1)	X		X	P(1)	X		P(1)
Retail Gasoline Outlets			X	X	X	X	X		
Streets, Highways & Freeways	X	P(1)	X	X(4)	X	P(5)	X		

X = anticipated
P = potential
(1) A potential pollutant if landscaping exists on-site.
(2) A potential pollutant if the project includes uncovered parking areas.
(3) A potential pollutant if land use involves food or animal waste products.
(4) Including petroleum hydrocarbons.
(5) Including solvents.

Source: City of Carlsbad Standard Urban Storm Water Mitigation Plan, 2010.

Based on the highlighted rows, the anticipated pollutants from the project include sediments, nutrients, heavy metals, organic compounds, trash & debris, oxygen demanding substances, oil and grease, bacteria and viruses, and pesticides.

2.2 Identify Pollutants of Concern in Receiving Waters

Based on Section 2 of the SUSMP, to identify pollutants of concern in receiving waters, the following analysis shall be conducted and reported in the project's SWMP: (1) for each of the proposed project discharge points, identify the receiving water(s), including hydrologic unit basin number(s), as identified in the most recent version of the "Water Quality Control Plan for the San Diego Basin," prepared by the SDRWQCB; and (2) identify any receiving waters, into which the developed area would discharge to, included in the "2006 CWA Section 303(d) List of Water Quality Limited Segments" approved by the SWRCB on October 25, 2006. List any and all pollutants for which the receiving waters are impaired.

Identification of Receiving Waters

According to the "Water Quality Control Plan for the San Diego Basin," dated September 8, 1994, prepared by the SDRWQCB, the project is located in the following hydrologic unit basin: El Salto Subarea in the Buena Vista Creek Hydrologic Area within the Carlsbad Hydrologic Unit. The corresponding hydrologic unit basin number designation is 904.21 (Region '9', Hydrologic Unit '04', Hydrologic Area '2', and Hydrologic Subarea '1'). An exhibit has been provided in Appendix B of this report titled, "Hydrologic Unit for Quarry Creek" which shows the project location within Hydrologic Unit 904.21. Project runoff discharges to Buena Vista Creek and ultimately discharges into Buena Vista Lagoon.

Identification of Receiving Water Impairments

On October 25, 2006, the SWRCB adopted the "2006 CWA Section 303(d) List of Water Quality Limited Segments" (2006 303(d) List). According to the 2006 303(d) List, Buena Vista Creek and Buena Vista Lagoon within HU 904.21 are identified as an impaired water bodies. Buena Vista Creek is listed for Selenium and Sediment Toxicity and Buena Vista Lagoon is listed for Indicator Bacteria, Nutrients and Sedimentation/Siltation.

Beneficial Uses of Receiving Water

According to the "Water Quality Control Plan for the San Diego Basin," dated September 8, 1994, prepared by the SDRWQCB the existing beneficial uses of the Buena Vista Creek and Buena Vista Lagoon are Agricultural Supply (AGR), Industrial Service Supply (IND), Contact Water Recreation (REC1), Non-contact Water Recreation (REC2), Warm Freshwater Habitat (WARM), Wildlife Habitat (WILD), Rare, Threatened or Endangered Species (RARE).

Pollutants of Concern for the Project

Based on Table 2 and the 2006 CWA Section 303(d) List of Water Quality Limited Segments, the following are the project's pollutants of concern: sediments, nutrients, heavy metals, organic compounds, trash and debris, oxygen demanding substances, oil and grease, bacteria and viruses, and pesticides. The LID design approach and source control BMPs will be utilized to treat these pollutants to the maximum extent practicable (MEP).

3.0 SOURCE CONTROL BMPs

The term "source control BMP" refers to land use or site planning practices, or structures that aim to prevent urban runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between pollutants and urban runoff. The following discussion identifies the source control BMPs for the project.

Table 3-1. Permanent and Operational Source Control Measures

Potential Source of Runoff Pollutants	***Permanent Source Control BMPs***	***Operational Source Control BMPs***
On-site storm drain inlets	Mark all inlets with the words "No Dumping! Flows to Bay" or similar.	Maintain and periodically repaint or replace inlet markings. Provide stormwater pollution prevention information to new site owners, lessees, or operators. Maintain storm drain inlets per Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
Interior floor drains and elevator shaft sump pumps	Interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	Inspect and maintain drains to prevent blockages and overflow.
Interior parking garages	State that parking garage floor drains will be plumbed to the sanitary sewer.	Inspect and maintain drains to prevent blockages and overflow.
Need for future indoor & structural pest control	Note building design features that discourage entry of pests.	Provide Integrated Pest Management information to owners, lessees, and operators.

Potential Source of Runoff Pollutants	*Permanent Source Control BMPs*	*Operational Source Control BMPs*
Landscape / Outdoor Pesticide Use	Final landscape plans will accomplish all of the following: Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	Maintain landscaping using minimum or no pesticides. Maintain buildings and common areas per Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com Provide IPM information to new owners, lessees and operators
Pools, spas, ponds, decorative fountains and other water features	If the local municipality requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.	Maintain water features per Fact Sheet SC-72, "Fountain and Pool Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

Potential Source of Runoff Pollutants	*Permanent Source Control BMPs*	*Operational Source Control BMPs*
Refuse areas	Site refuse will be handled and provide supporting detail to what is shown on plans. State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	The following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. Handle and dispose of waste per Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Outdoor storage of equipment or materials	Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of local Hazardous Materials Programs for: • Hazardous Waste Generation • Hazardous Materials Release Response and Inventory • California Accidental Release (CalARP) • Aboveground Storage Tank • Uniform Fire Code Article 80 Section 103(b) & (c) 1991 • Underground Storage Tank	Store outdoor equipment and materials per Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Miscellaneous drain or wash water: Roofing, gutters, and trim	Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	
Plazas, sidewalks, and parking lots		Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.

Source: City of Carlsbad Standard Urban Storm Water Mitigation Plan, 2010.

4.0 INTEGRATED LOW IMPACT DEVELOPMENT (LID) DESIGN STRATEGIES

The following discussion addresses requirements of Section 4 of the SUSMP. As listed in the section, projects subject to Priority Development Project requirements, at minimum, must implement an integrated LID approach to develop and size IMPs or "Alternatives to LID Design," which requires you to show how you satisfy each stormwater objective separately.

The project will implement an integrated LID approach to meet criteria described in the SUSMP. As an approach to Integrated LID design, the following sections will discuss LID strategies for managing runoff from the project.

4.1 Optimization of Site Layout

The project is proposing to grade lots and construct utilities and roads upon previously mass graded lots. The project is designed to provide a 50-foot building setback as well as a 100-foot vegetated buffer area in between the development and Buena Vista Creek and the wetland preserve. Therefore, the project is building upon less sensitive areas of the site and is minimizing disturbance of natural areas. The vegetated buffer will also provide an area where drainage can be used as a design element to incorporate the proposed IMP facilities.

Wherever feasible, landscape and vegetated areas will be utilized to minimize directly connected impervious areas. In order to maximize canopy interception and water conservation, the project will provide native or drought tolerant vegetation for proposed landscape areas and include trees for canopy interception.

4.2 Use of Pervious Surfaces

Where feasible future development within each of the lots within the project will incorporate pervious surfaces throughout the project in accordance with City of Carlsbad requirements.

4.3 Dispersal of Runoff to Pervious Areas

Where feasible, the project site shall incorporate landscaping areas on the site that collect runoff from impervious surfaces prior to collection into the storm drain system. Sidewalks and walkways may be designed as non-contiguous within the future lots, thereby allowing sidewalk runoff to flow across vegetated areas prior to conveyance within the street.

4.4 Use of Integrated Management Practices

The term "Integrated Management Practice" (IMP) refers to a facility that provides small-scale treatment, retention, and/or detention and is integrated into site layout, landscaping and drainage design. Following tables of the City SUSMP have been evaluated to determine appropriate IMPs for treatment of runoff potentially containing most pollutants of concern. The tables are renamed as Table 6-1 and 6-2 and reproduced below.

Table 4-1. Grouping of Potential Pollutants of Concern by Fate during Stormwater Treatment

Pollutants of Concern	*Bioretention Extended Detention Facilities (LID)	Settling Basins (Dry Ponds)	Wet Ponds and Wetlands	Infiltration Facilities or Practices (LID)	Media Filters	High-rate biofilters	High-rate media filters	Trash Racks & Hydro-dynamic Devices
Coarse Sediment and Trash	High	High	High	High	High	High	*High	High
Pollutants that tend to associate with fine particles during treatment	High	High	High	High	High	Medium	*Medium	Low
Pollutants that tend to be dissolved following treatment	Medium	Low	Medium	High	Low	Low	*Low	Low

Source: City of Carlsbad Standard Urban Storm Water Mitigation Plan, 2010.

Bioretention Extended Detention Facilities are proposed for treatment of onsite runoff from the Quarry Creek project. However, offsite low-flows from two adjacent watersheds are proposed to be treated using High-rate media filters.

Table 4-2. Groups of Pollutants and Relative Effectiveness of Treatment Facilities

Pollutant	Coarse Sediment and Trash	Pollutants that tend to associate with fine particles during treatment	Pollutants that tend to be dissolved following treatment
Sediment	X	X	
Nutrients		X	X
Heavy Metals		X	
Organic Compounds		X	
Trash & Debris	X		
Oxygen Demanding		X	
Bacteria		X	
Oil & Grease		X	
Pesticides		X	

Source: City of Carlsbad Standard Urban Storm Water Mitigation Plan, 2010.

The following IMPs are considered appropriate for treatment of runoff potentially containing most pollutants of concern:

- **Bioretention Extended Detention facilities**, which can be configured as swales, free-form areas, or planters to integrate with your landscape design – **SELECTED**
- **Flow-through planters**, which can be used near building foundations and other locations where infiltration to native soils is not desired – **Not Selected**
- **Dry wells**, which can be used only where soils are permeable – **Not Selected**
- **Cisterns**, in combination with a bioretention facility – **Not Selected**

In order to determine the most appropriate IMP (or combination thereof) for the project, several design alternatives were considered, including locating bioretention areas within the parkway for the street and utilizing pervious pavement within the street and for the Park and Ride. The necessary areas required to treat the runoff from the project made utilizing the parkway for bioretention difficult to achieve. The most practical location for an IMP the 50-foot building setback and 100-foot vegetated buffer areas previously discussed. These areas provide adequate space and optimize the project site layout. Therefore bioretention extended detention basins in these areas are the most suitable IMP for the project. A summary of the treatment basin surface area as a ratio of the impervious area for each basin is provided in the table below. Refer to the table titled "Land Use Combination Parameters – Post-project" in Appendix D for the impervious area calculations.

Quarry Creek
Impervious Area vs Treatment Surface Area

POC	Extended Detention Basin	Impervious Area (ac)	Treatment Basin Surface Area (ac)	Ratio of Treatment Basin Surface Area to Impervious Area
POC 1	EDB 1	8.6	0.72	0.08
POC 3-2	EDB 3-2	9.6	0.66	0.07
POC 3-3	EDB 3-3	4.9	0.45	0.09
POC 3-7	EDB 3-7	0.7	0.03	0.04
POC 4	EDB 4	19.5	1.4	0.07
POC 5	EDB 5	4.7	0.36	0.08
POC 6	EDB 6	4.7	0.29	0.06

5.0 HYDROMODIFICATION

In accordance with the Municipal Permit and final hydromodification management plan (HMP) dated March 2011, Section 2 of the SUSMP states that projects subject to Priority Development Project requirements might be required to implement measures so that post-development runoff rates and durations do not exceed pre-project conditions (hydromodification controls). The following methods may be used to meet HMP mitigation requirements: Design BMPs pursuant to standard sizing and specification criteria detailed in the SUSMP and the HMP/LID Sizing Calculator, use the automated sizing calculator (San Diego Sizing Calculator) that will allow project applicants to select and size IMP treatment devices or flow control basins, use a continuous simulation model to compare pre-project and mitigated post-project runoff and durations until compliance to flow control standards can be demonstrated, or identify a specified exemption defined in the SUSMP and final HMP.

According to Figure 2-1, HMP Applicability Determination Matrix, in the SUSMP, the Quarry Creek project is subject to the final HMP. Therefore, a hydromodification management strategy has been developed for the project. The project will use a network of storm water management features that have been sized based on IMP and BMP sizing approach for hydromodification management. The continuous simulation model, the San Diego Hydrology Model (SDHM) from Clear Creek Solutions was used to compare pre-project and mitigated post-project runoff and durations to comply with flow control standards as defined in the final HMP.

5.1 MODELING METHODOLOGY

Based on the final HMP, a range of runoff flow rates was required to be determined to identify the range for which Priority Development Project (PDP) post-project runoff flows and durations shall not exceed pre-project runoff flows and durations. In order to meet this requirement, results of a hydromodification management analysis must meet the following criteria:

- For flow rates between the pre-project lower flow threshold and the pre-project 10-year event, the post-project discharge rates and durations may not deviate above the pre-project

rates and durations by more than 10% over more than 10% of the length of the flow duration curve.

- Lower flow thresholds may be determined using the HMP Decision Matrix along with a critical flow calculator and channel screening tools developed by the Southern California Coastal Water research Project (SCCWRP). These methods identify lower flow thresholds for a range of channel conditions. The critical flow calculator recommends a lower flow value of 0.1Q2, 0.3Q2, or 0.5Q2 dependent on the receiving channel material and dimensions. This value will be compared to the channel susceptibility rating (High, Medium, or Low) as determined from the SCCWRP screening tools to determine the final lower flow threshold.
- The lower flow threshold may alternately be determined as 10 percent of the pre-project 2-year runoff event, or 0.1Q2. This approach, which is outlined in the HMP Decision Matrix, is available if the project applicant chooses not to complete the channel screening analysis.

The continuous simulation modeling for this project was performed using the San Diego Hydrology Model (SDHM) from Clear Creek Solutions. The release date for the version of SDHM utilized for the project is March 1, 2012. SDHM was used to analyze the proposed project for compliance with the Final Hydromodification Management Criteria. The software is capable of modeling hydromodification management (flow control) facilities to mitigate the effects of increased runoff from the post-project land use changes that may cause negative impacts (i.e. erosions) to downstream channels.

Standards developed as part of the final HMP to control runoff peak flows and durations are based on a continuous simulation of runoff using local rainfall data. SDHM is based on actual recorded precipitation data. The rainfall gauge selected for this project was the Oceanside gauge, which represents the project appropriately based on isopluvial and precipitation zone characteristics and has hourly data for the period of record of 1949 to 2007.

The program is a continuous simulation program accounting for all storm events, which differ from typical methods of using the peak from a single storm event (i.e. 100-year). SDHM uses

the Hydrologic Simulation Program Fortran (HSPF) software as its computational engine to run rainfall-runoff algorithms.

Partial Duration

The peak flow frequency statistics (i.e. Q2 and Q10) estimates how often flow rates will exceed a given threshold. There are two common methods to determine the frequency of recurrence of flood data: annual maximum series or partial duration series. The annual maximum series selects the highest peak discharge in one year. The partial duration series considers multiple storm events in a given year. According to the Final HMP, the need for partial duration statistics is more pronounced for control standards based on more frequent return intervals (such as the 2-year runoff event) since the peak annual series does not perform as well in the estimation of such events. The use of a partial duration series is recommended for semi-arid climates similar to San Diego County, where prolonged dry periods can skew peak flow frequency results determined by a peak annual series for more frequent runoff events. The partial duration series provides better resolution for assigning recurrence intervals to events that occur more frequently than once per 10 years, which are the events that are most important for the HMP. SDHM (November 11, 2011 version) defaults to compute peak flow frequency statistics by constructing a partial duration series. For the statistical analysis of the rainfall record, partial duration series events have been separated into discrete rainfall events assuming the following criteria.

- To determine a discrete rainfall event, a lower flow limit was set to a very small value, equal to 0.002 cfs per acre of contributing drainage area.
- A new discrete event is designated when the flow falls below 0.002 cfs per acre for a time period of 24 hours.

Drawdown Time

The HMP and/or water quality (WQ) drawdown time is the time it takes for the basin to empty the HMP and/or WQ volume. The SDHM program calculates the HMP drawdown time for the maximum stage that occurs in the basins in continuous simulation. Preliminary Water Quality draw-down times were estimated using HEC-1. Copies of the draw-down calculations are

included in Appendix C. Additional calculations will be required during final design to verify the WQ draw down timing.

5.2 MODELING RESULTS

There are six (6) Points of Compliance (POC) for the project. Therefore, the SDHM analysis is organized accordingly. Each drainage basin will employ similar strategies for compliance with the HMP. Runoff from each basin will be directed to permanent storm water management features in the form of bioretention extended detention facilities which will meet both hydromodification and water quality treatment requirements.

Chang Consultants prepared a report titled, "Hydromodification Screening for Quarry Creek," revised October 5, 2012, which summarized the results of a channel screening analysis and determined that the lower flow threshold is $0.5Q_2$ is appropriate for the Quarry Creek project. Therefore this lower flow threshold was used in the continuous simulation analysis.

Summary of Results and SDHM Output

The preliminary sizing for required HMP volumes for each drainage basin is summarized in the table below.

Quarry Creek - HMP Mitigation Feature Summary Table

POC	Extended Detention Basin	Q Threshold (cfs)	BL (ft)	BW (ft)	10-Yr Volume (ac-ft)	Riser Size Ht x Diam (ft x ft)	Orifice Diam (in)
POC 1	EDB 1	0.5Q2	385	35	1.06	3 x 1.5	6
POC 3-2	EDB 3-2	0.5Q2	488	25	1.2	3 x 1.5	5.5
POC 3-3	EDB 3-3	0.5Q2	475	13	0.7	3 x 1.5	4
POC 3-7	EDB 3-7	0.5Q2	28	28	0.1	3 x 1.5	2
POC 4	EDB 4	0.5Q2	540	40	2.4	4 x 1.5	7.5
POC 5	EDB 5	0.5Q2	380	30	0.5	1.5 x 1.5	5
POC 6	EDB 6	0.5Q2	150	44	0.6	3 x 1.5	4

Support material and individual SDHM output for each drainage basin are included in the SDHM results, located in Appendix D of this report. Please refer Appendix D for summary tables and supporting exhibits utilized in the SDHM analyses for post-project soil, slope, and land use. These exhibits delineate the drainage basin and ID tributary to each point of compliance (POC). The HMP Basins will have adequate volume to provide 85th percentile volume storm water quality treatment for the tributary runoff from the roadways and lots. The preliminary sizing for required water quality volume and flow rates are also included in Appendix C of this report.

6.0 DOCUMENTATION OF STORM WATER DESIGN

Documentation of drainage basins and location of IMPs is located in Appendix D and on the DMA/IMP/BMP Exhibit in Appendix E of this report.

7.0 OPERATION AND MAINTENANCE

The owner of each IMP facility will ensure the ongoing maintenance for the permanent stormwater facilities proposed for the project. The owner will be responsible for properly disposing of waste material from their assumed areas within the project site, maintaining landscaping throughout those areas in a manner that will prevent soil erosion and minimize sediment transport, and maintaining drainage facilities located throughout the project area in a clean manner and in good repair. In addition, the owner will be responsible for maintaining all stormwater facilities

Typical Maintenance Procedures for Stormwater Facilities

The following stormwater facilities require permanent maintenance: bioretention extended detention facilities. The discussions below provide inspection criteria, maintenance indicators, and maintenance activities for the storm water facilities.

Bioretention Extended Detention Facilities

- Inspect extended detention facilities at least twice annually for erosion, damage to vegetation, and sediment and debris accumulation, preferably at the start and end of the wet season to be sure the area is ready for winter and to schedule follow-up maintenance, if necessary. Inspection should also occur after periods of heavy runoff to ensure continued functionality of each system (i.e. – 0.5 inch storm events or greater).
- Grass height and mowing frequency (if appropriate) may not have a large impact on pollutant removal. Consequently, mowing may only be necessary once or twice a year for safety or aesthetics or to suppress weeds and woody vegetation.
- Trash tends to accumulate in extended detention facilities. The need for litter removal is determined through periodic inspection, but litter should always be removed prior to mowing.
- Sediment accumulating in extended detention facilities should be removed when it builds up to 75 mm (3 in.) at any spot, or covers vegetation.

- Regularly inspect extended detention facilities for pools of standing water. Extended detention facilities can become a nuisance and promote mosquito breeding in standing water if obstructions develop (e.g. debris accumulation, invasive vegetation) and/or if proper drainage is not implemented and maintained.
- Outfall locations that enter or exit facilities should be checked for erosion, ponding, trash/debris, and other structural damage.

Bio Clean Water Polisher Up Flow Media Filter

Inspection/maintenance of the *Bio Clean Water Polisher Up Flow Media Filter* must be performed by properly trained personnel. Maintenance may involve handling of potentially hazardous material. Therefore the maintenance operator may need to be properly trained in handling and disposal of hazardous waste. The party responsible to ensure implementation and funding of maintenance of permanent BMPs will be responsible to select a maintenance contractor for maintenance of the Bio Clean Water Polisher Up Flow Media Filter who meets this requirement, and to contract for additional cleaning and disposal services as necessary if non-routine cleaning and disposal is required. There are several storm drain cleaning service providers who are able to inspect and/or maintain this product.

During inspection, the inspector shall check for the maintenance indicators given below:

- Accumulation of sediment, litter and/or debris.
- Spent filter media cartridges. When the media is spent it is typically indicated by a change in color of the material.
- Damage to internal components within the product.

Routine maintenance of the Bio Clean Water Polisher Up Flow Media Filter shall include removal and proper disposal of accumulated materials (e.g., sediment, litter) from the product and replacement of the media cartridges.

If inspection indicates that internal components within the product are damaged, additional non-routine maintenance will be required to repair or replace the damaged parts as applicable. The party responsible to ensure implementation and funding of maintenance of permanent BMPs shall contract for additional cleaning and disposal services as necessary if non-routine cleaning and disposal is required.

In addition to the stormwater facilities intended as part of the IMP design, the following identifies additional LID and source control BMPs that required routine inspection and maintenance:

Landscaped Areas

Inspection and maintenance of the vegetated areas may be performed by the landscape maintenance contractor.

During inspection, the inspector shall check for the maintenance indicators given below:

- Erosion in the form of rills or gullies
- Ponding water
- Bare areas or less than 70% vegetation cover
- Animal burrows, holes, or mounds
- Trash

Routine maintenance of vegetated areas shall include mowing and trimming vegetation, and removal and proper disposal of trash.

If erosion, ponding water, bare areas, poor vegetation establishment, or disturbance by animals are identified during the inspection, additional (non-routine) maintenance will be required to correct the problem. For ponding water or erosion, see also inspection and maintenance measures for irrigation systems. In the event that any non-routine maintenance issues are persistently encountered such as poor vegetation establishment, erosion in the form of rills or gullies, or ponding water, the party responsible to ensure that maintenance is performed in perpetuity shall consult a licensed landscape architect or engineer as applicable.

As applicable, IPM procedures must be incorporated in any corrective measures that are implemented in response to damage by pests. This may include using physical barriers to keep pests out of landscaping; physical pest elimination techniques, such as, weeding, squashing, trapping, washing, or pruning out pests; relying on natural enemies to eat pests; or proper use of pesticides as a last line of defense. More information can be obtained at the UC Davis website (http://www.ipm.ucdavis.edu/WATER/U/index.html).

Concrete Stamping

Inspection and maintenance of the concrete stamping may be performed by the building/facilities maintenance contractor or other employees of the project owner, as applicable. In addition, there may be storm drain maintenance contractors who will perform this service for a fee.

During inspection, the inspector(s) shall check for the maintenance indicators given below:

- Faded, vandalized, or otherwise unreadable concrete stamping

There are no routine maintenance activities for the concrete stamping. If inspection indicates the concrete stamping is intact, no action is required.

If inspection indicates the concrete stamping is not legible, the concrete stamping shall be repaired or replaced as applicable.

Irrigation Systems

Inspection and maintenance of the irrigation system may be performed by the landscape maintenance contractor.

During inspection, the inspector shall check for the maintenance indicators given below:

- Eroded areas due to concentrated flow
- Ponding water
- Refer to proprietary product information for the irrigation system for other maintenance indicators, as applicable

Refer to proprietary product information for the irrigation system for routine maintenance activities for the irrigation system, as applicable. If none of the maintenance indicators listed above are identified during inspection of the irrigation system, no other action is required.

If any of the maintenance indicators listed above are identified during the inspection, additional (non-routine) maintenance will be required to restore the irrigation system to an operable condition. If inspection indicates breaks or leaks in the irrigation lines or individual sprinkler heads, the affected portion of the irrigation system shall be repaired. If inspection indicates eroded areas due to concentrated flow from the irrigation system, the eroded areas shall be repaired and the irrigation system shall be adjusted or repaired as applicable to prevent further erosion. If inspection indicates ponding water resulting from the irrigation system, the irrigation system operator shall identify the cause of the ponded water and adjust or repair the irrigation system as applicable to prevent ponding water. Refer to proprietary product information for the irrigation system for other non-routine maintenance activities as applicable.

Inspection and Maintenance Frequency

Typically, maintenance requirements are site and product specific, and will depend on the particular land use activities and the amount of gross pollutants and sediment generated within the drainage areas. If it is determined during the regularly scheduled inspection and routine maintenance that the BMPs/IMPs require more frequent maintenance to remove accumulated sediment, trash or debris, it may be necessary to increase the frequency of inspection and routine maintenance.

The Table on the following page lists the stormwater facilities to be inspected and maintained and the minimum frequency of inspection and maintenance activities.

Table 7-1. Summary Table of Inspection and Maintenance Frequency (Minimum)

BMP / IMP	Inspection Frequency	Maintenance Frequency
Bioretention Extended Detention Facilities	Twice a year, and after major storm events	Routine maintenance to remove accumulated materials such as trash and debris: twice a year, on or before September 30th As-needed maintenance based on maintenance indicators in this section
Bio Clean Water Polisher Up Flow Media Filter (treatment control BMP)	Twice a year, and after major storm events	Routine maintenance to remove accumulated materials and replace media cartridges: twice a year, on or before September 30th As-needed maintenance based on maintenance indicators in this section
Landscaped Areas	Monthly	Routine mowing and trimming and trash removal: monthly Non-routine maintenance as-needed based on maintenance indicators in this section
Concrete Stamping	Annual	As-needed based on maintenance indicators in this section
Irrigation Systems	Monthly	As-needed based on maintenance indicators in this section

Qualifications of Maintenance Personnel

The LID and treatment control BMPs or IMPs are features that are integrated into site layout, landscaping and drainage design. The typical maintenance activities for landscaped areas and bioretention extended detention facilities can generally be accomplished by typical landscape maintenance personnel. The contracting of additional services may be necessary if non-routine cleaning, disposal or repair is required for any of the project's storm water facilities.

If evidence of illegal dumping of hazardous materials is identified in a storm water facility, the illegally dumped materials shall be cleaned up and disposed of properly. Specialized clean up and disposal of illegally dumped hazardous materials may be outside of the owner expertise. In this event, the owner shall contract for additional cleaning and disposal services as necessary if non-routine cleaning and disposal is required.

Record Keeping Requirements

The owner is responsible to ensure implementation and funding of maintenance of permanent BMPs and shall maintain records documenting the inspection and maintenance activities. Parties responsible for the operation and maintenacne shall retain records for at least 5 years.

8.0 SWMP CERTIFICATION STATEMENTS

Preparer's Certification

The selection, sizing, and preliminary design of storm water treatment and other control measures in this plan meet the requirements of Regional Water Quality Control Board Order R9-2007-0001 and subsequent amendments.

_____ _____

Dennis C. Bowling Date
R.C.E #32838, Exp. 06/14

Future Owner's Certification

I certify that, as owner of the property described herein, I have read and understand the requirements of this Storm Water Management Plan (SWMP) and that I am responsible for ensuring that all storm water treatment measures described within said SWMP will be properly implemented, monitored and maintained.

TO BE COMPLETED BY FUTURE LOT OWNERS

Name: _____ Date: _____
Company: _____
Address: _____
Address: _____
Phone No: __(_____)_____-_____

APPENDIX A

City of Carlsbad
Storm Water Standards Questionnaire
(SWSQ)

CITY OF CARLSBAD

STORM WATER STANDARDS QUESTIONNAIRE E-34

Development Services
Land Development Engineering
1635 Faraday Avenue
760-602-2750
www.carlsbadca.gov

INSTRUCTIONS:

To address post-development pollutants that may be generated from development projects, the City requires that new development and significant redevelopment priority projects incorporate Permanent Storm Water Best Management Practices (BMP's) into the project design per the City's Standard Urban Stormwater Management Plan (SUSMP). To view the SUSMP, refer to the Engineering Standards (Volume 4, Chapter 2) at www.carlsbadca.gov/standards.

Initially this questionnaire must be completed by the applicant in advance of submitting for a development application (subdivision, discretionary permits and/or construction permits). The results of the questionnaire determine the level of storm water standards that must be applied to a proposed development or redevelopment project. Depending on the outcome, your project will either be subject to 'Standard Stormwater Requirements' or be subject to additional criteria called 'Priority Development Project Requirements'. Many aspects of project site design are dependent upon the storm water standards applied to a project.

Your responses to the questionnaire represent an initial assessment of the proposed project conditions and impacts. City staff has responsibility for making the final assessment after submission of the development application. If staff determines that the questionnaire was incorrectly filled out and is subject to more stringent storm water standards than initially assessed by you, this will result in the return of the development application as incomplete. In this case, please make the changes to the questionnaire and resubmit to the City.

If you are unsure about the meaning of a question or need help in determining how to respond to one or more of the questions, please seek assistance from Land Development Engineering staff.

A separate completed and signed questionnaire must be submitted for each new development application submission. Only one completed and signed questionnaire is required when multiple development applications for the same project are submitted concurrently. In addition to this questionnaire, you must also complete, sign and submit a Project Threat Assessment Form with construction permits for the project.

Please start by completing Section 1 and follow the instructions. When completed, sign the form at the end and submit this with your application to the city.

SECTION 1 NEW DEVELOPMENT

Does your project meet one or more of the following criteria:	YES	NO
1. ***Housing subdivisions of 10 or more dwelling units***. Examples: single family homes, multi-family homes, condominium and apartments		
2. ***Commercial – greater than 1-acre.*** Any development other than heavy industry or residential. Examples: hospitals; laboratories and other medical facilities; educational institutions; recreational facilities; municipal facilities; commercial nurseries; multi-apartment buildings; car wash facilities; mini-malls and other business complexes; shopping malls; hotels; office buildings; public warehouses; automotive dealerships; airfields; and other light industrial facilities.		
3. ***Heavy Industrial / Industry- greater than 1 acre.*** Examples: manufacturing plants, food processing plants, metal working facilities, printing plants, and fleet storage areas (bus, truck, etc.).		
4. ***Automotive repair shop.*** A facility categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, and 7536-7539		
5. ***Restaurants.*** Any facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is greater than 5,000 square feet. Restaurants where land development is less than 5,000 square feet shall meet all SUSMP requirements except for structural treatment BMP and numeric sizing criteria requirements and hydromodification requirements.		

CITY OF CARLSBAD

STORM WATER STANDARDS QUESTIONNAIRE E-34

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6. *Hillside development.* Any development that creates more than 5,000 square feet of impervious surface and is located in an area with known erosive soil conditions, where the development will grade on any natural slope that is twenty-five percent (25%) or greater.		
7. *Environmentally Sensitive Area (ESA)*[1]. All development located within or directly adjacent[2] to or discharging directly[3] to an ESA (where discharges from the development or redevelopment will enter receiving waters within the ESA), which either creates 2,500 square feet or more of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site 10% or more of its naturally occurring condition.	X	
8. *Parking lot.* Area of 5,000 square feet or more, or with 15 or more parking spaces, and potentially exposed to urban runoff	X	
9. *Streets, roads, highways, and freeways.* Any paved surface that is 5,000 square feet or greater used for the transportation of automobiles, trucks, motorcycles, and other vehicles	X	
10. *Retail Gasoline Outlets.* Serving more than 100 vehicles per day and greater than 5,000 square feet		
11. *Coastal Development Zone.* Any project located within 200 feet of the Pacific Ocean and (1) creates more than 2500 square feet of impervious surface or (2) increases impervious surface on property by more than 10%.		
12. *More than 1-acre of disturbance.* Project results in the disturbance of 1-acre or more of land and is considered a Pollutant-generating Development Project[4].	X	

1 Environmentally Sensitive Areas include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Resources Control Board (Water Quality Control Plan for the San Diego Basin (1994) and amendments); water bodies designated with the RARE beneficial use by the State Water Resources Control Board (Water Quality Control Plan for the San Diego Basin (1994) and amendments); areas designated as preserves or their equivalent under the Multi Species Conservation Program within the Cities and County of San Diego; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees.

2 "Directly adjacent" means situated within 200 feet of the Environmentally Sensitive Area.

3 "Discharging directly to" means outflow from a drainage conveyance system that is composed entirely of flows from the subject development or redevelopment site, and not commingled with flow from adjacent lands.

4 Pollutant-generating Development Projects are those projects that generate pollutants at levels greater than background levels. In general, these include all projects that contribute to an exceedance to an impaired water body or which create new impervious surfaces greater than 5000 square feet and/or introduce new landscaping areas that require routine use of fertilizers and pesticides. In most cases linear pathway projects that are for infrequent vehicle use, such as emergency or maintenance access, or for pedestrian or bicycle use, are not considered Pollutant-generating Development Projects if they are built with pervious surfaces or if they sheet flow to surrounding pervious surfaces.

INSTRUCTIONS:

Section 1 Results:

If you answered YES to ANY of the questions above, your project is subject to **Priority Development Project** requirements. Skip Section 2 and please proceed to Section 3. Check the "meets PRIORITY DEVELOPMENT PROJECT requirements" box in Section 3. Additional storm water requirements will apply per the SUSMP.

If you answered NO to ALL of the questions above, then please proceed to Section 2 and follow the instructions.

CITY OF CARLSBAD

STORM WATER STANDARDS QUESTIONNAIRE E-34

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SECTION 2 SIGNIFICANT REDEVELOPMENT

INSTRUCTIONS: Complete the questions below regarding your project	YES	NO
1. Project results in the disturbance of 1-acre or more of land and is considered a Pollutant-generating Development Project *?		
INSTRUCTIONS: If you answered NO, please proceed to question 2. If you answered YES, then you ARE a significant redevelopment and you ARE subject to PRIORITY DEVELOPMENT PROJECT requirements. Please check the "meets PRIORITY DEVELOPMENT PROJECT requirements" box in Section 3 below.		
2. Is the project redeveloping an existing priority project type? (Priority projects are defined in Section 1)		
INSTRUCTIONS: If you answered YES, please proceed to question 3. If you answered NO, then you ARE NOT a significant redevelopment and your project is subject to STANDARD STORMWATER REQUIREMENTS. Please check the "does not meet PDP requirements" box in Section 3 below.		
3. Is the work limited to trenching and resurfacing associated with utility work; resurfacing and reconfiguring surface parking lots and existing roadways; new sidewalk; bike lane on existing road and/or routine maintenance of damaged pavement such as pothole repair? Resurfacing/reconfiguring parking lots is where the work does not expose underlying soil during construction.		
INSTRUCTIONS: If you answered NO, then proceed to question 4. If you answered YES, then you ARE NOT a significant redevelopment and your project is subject to STANDARD STORMWATER REQUIREMENTS. Please check the "does not meet PDP requirements" box in Section 3 below.		
4. Will your redevelopment project create, replace, or add at least 5,000 square feet of impervious surfaces on existing developed property or will your project be located within 200 feet of the Pacific Ocean and (1) create 2600 square feet or more of impervious surface or (2) increases impervious surface on the property by more than 10%? Replacement of existing impervious surfaces includes any activity that is not part of routine maintenance where impervious material(s) are removed, exposing underlying soil during construction.		
INSTRUCTIONS: If you answered YES, you ARE a significant redevelopment, and you ARE subject to PRIORITY DEVELOPMENT PROJECT requirements. Please check the "meets PRIORITY DEVELOPMENT PROJECT requirements" box in Section 3 below. Review SUSMP to find out if SUSMP requirements apply to your project envelope or the entire project site. If you answered NO, then you ARE NOT a significant redevelopment and your project is subject to STANDARD STORMWATER REQUIREMENTS. Please check the "does not meet PDP requirements" box in Section 3 below.		

*for definition see Footnote 4 on page 2

SECTION 3 QUESTIONNAIRE RESULTS

☒ My project meets PRIORITY DEVELOPMENT PROJECT (PDP) requirements and must comply with additional stormwater criteria per the SUSMP and I understand I must prepare a Storm Water Management Plan for submittal at time of application. I understand flow control (hydromodification) requirements may apply to my project. Refer to SUSMP for details.

☐ My project does not meet PDP requirements and must only comply with STANDARD STORMWATER REQUIREMENTS per the SUSMP. As part of these requirements, I will incorporate low impact development strategies throughout my project.

Applicant Information and Signature Box

Address: HAYMAR DRIVE	Assessor's Parcel Number(s): 167-040-11&21
Applicant Name: QUARRY CREEK INVESTORS, LLC	Applicant Title:
Applicant Signature: Don Mitchell SVP	Date: 12.19.11

This Box for City Use Only

City Concurrence:	YES	NO
By:		
Date:		
Project ID:		

APPENDIX B

HMP Applicability Determination Matrix

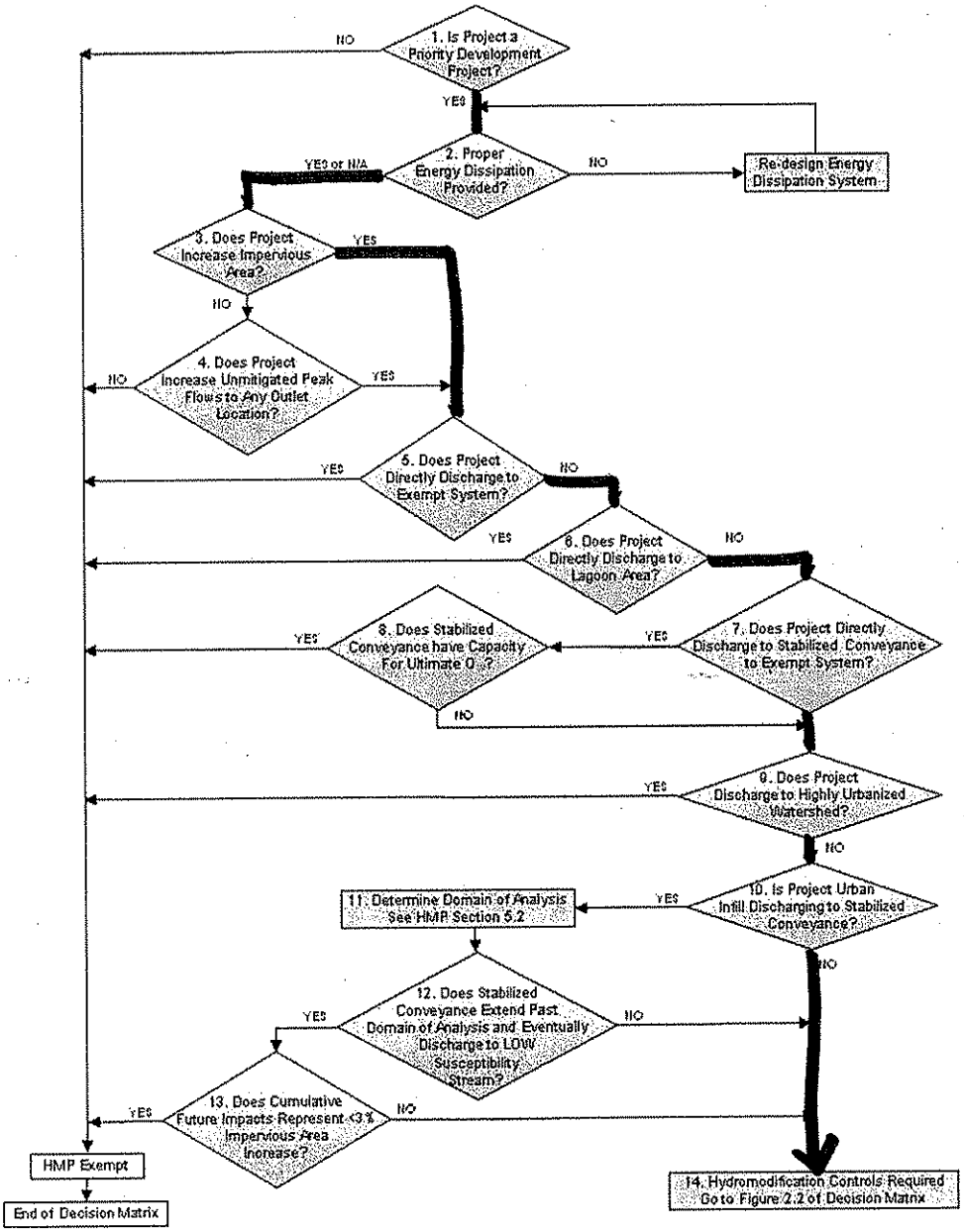
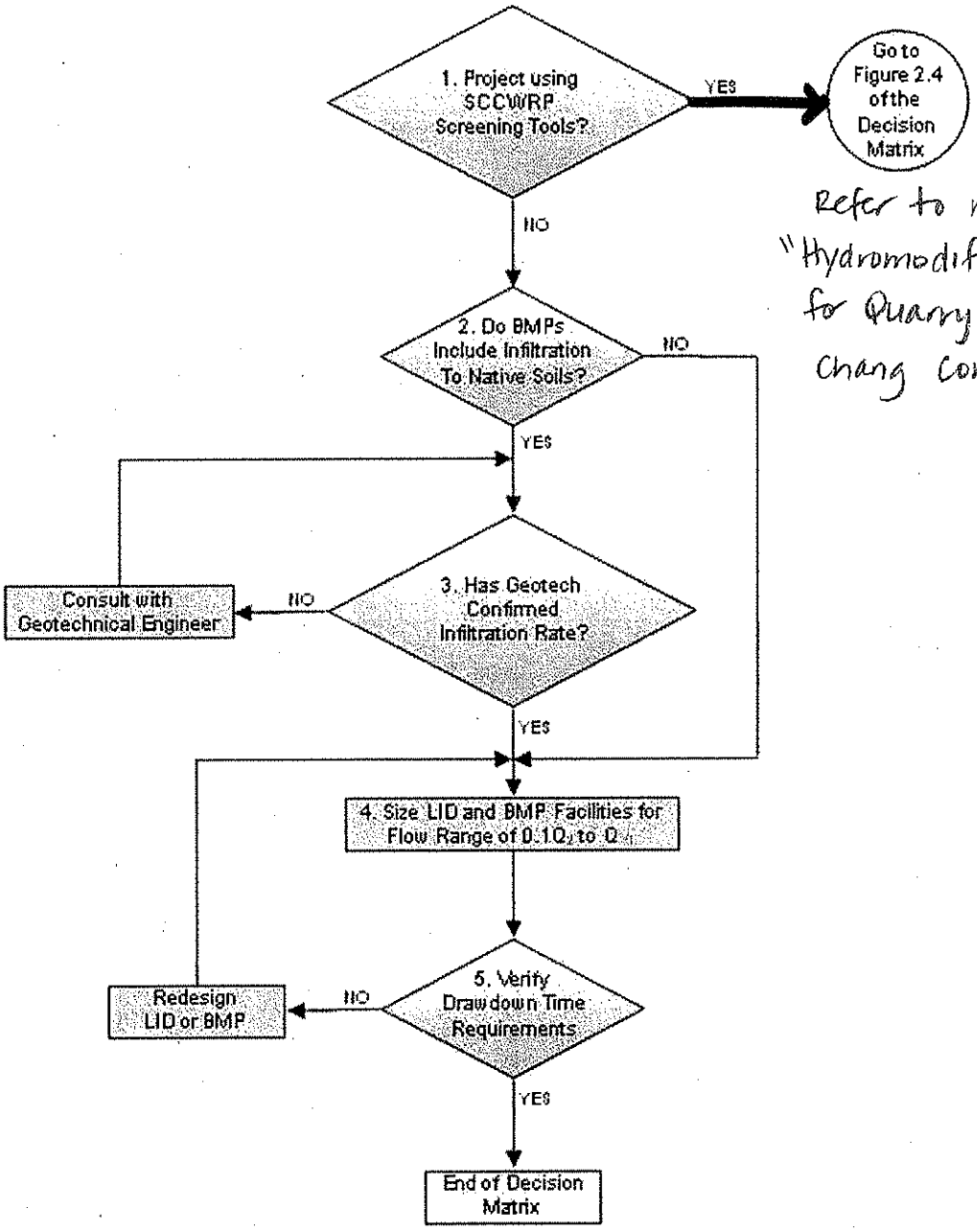


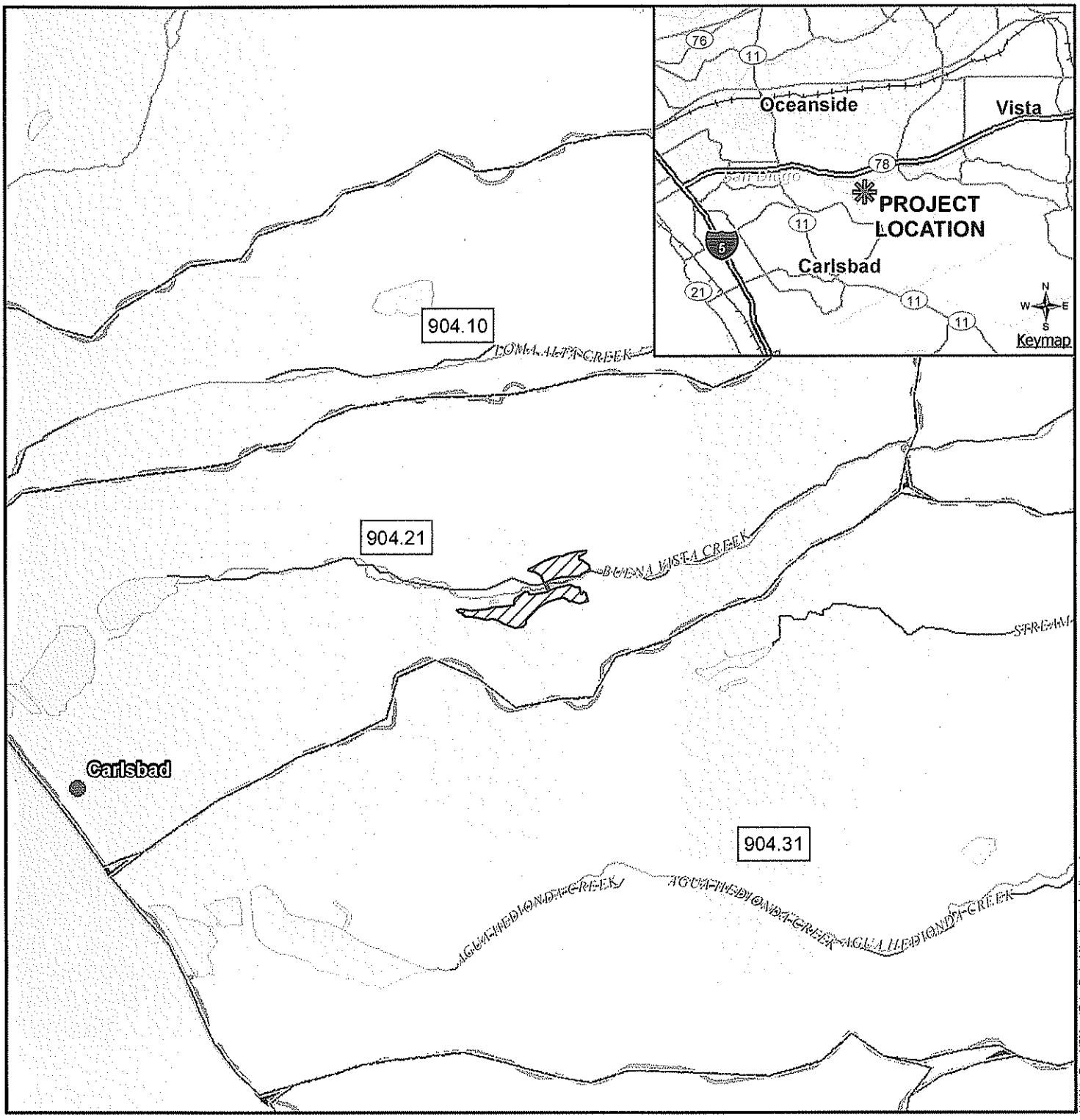
FIGURE 2-1. HMP Applicability Determination*

*refer to expanded HMP exemption criteria below for justifications required on each node



Refer to report titled "Hydromodification Screening for Quarry Creek" by Chang Consultants

FIGURE 2-2. Mitigation Criteria and Implementation I



N
W E
S

1 inch = 1 mile

Project Area

Hydrologic Unit Basin Map

Quarry Creek

RICK ENGINEERING COMPANY

J-16483

December 20, 2011

Data Source: California Interagency Watershed Mapping Committee - 2004

APPENDIX C

Water Quality Treatment Calculations and Support Materials

Quarry Creek
Water Quality Treatment Volume Summary Table

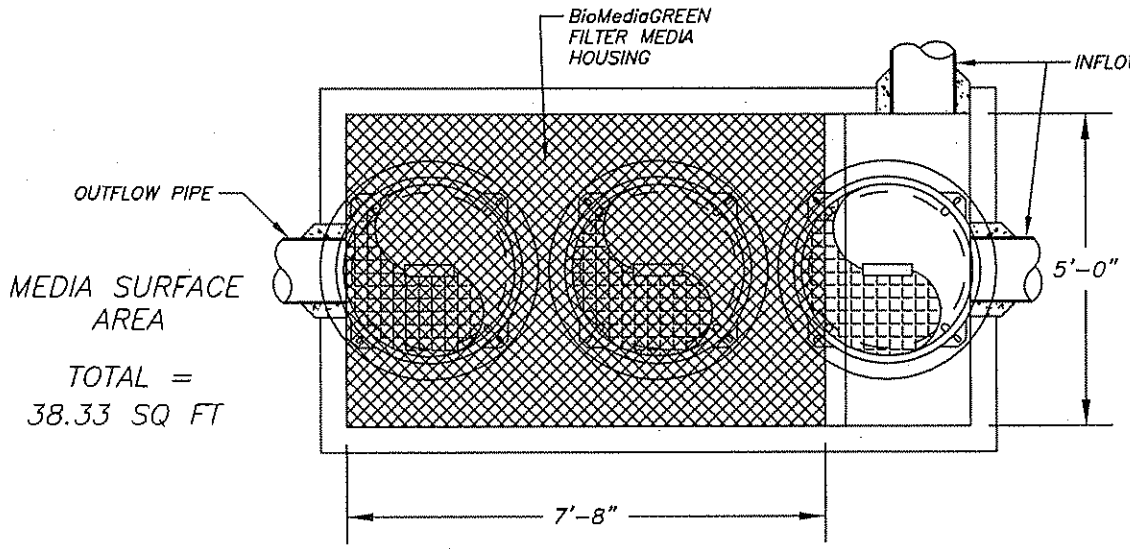
POC	Extended Detention Basin	85th percentile (in)	Weighted C-value	Area (ac)	Water Quality Volumes (ac-ft)	Provided Basin Volume (ac-ft)	Drawdown Time (hr)
POC 1	EDB 1	0.65	0.68	14.3	0.527	1.30	15.25
POC 3-2	EDB 3-2	0.65	0.76	12.9	0.531	1.51	20.5
POC 3-3	EDB 3-3	0.65	0.72	7.3	0.285	0.85	17.25
POC 3-7	EDB 3-7	0.65	0.55	2.0	0.060	0.21	11
POC 4	EDB 4	0.65	0.75	26.6	1.081	4.60	24.5
POC 5	EDB 5	0.65	0.79	5.9	0.252	0.92	17.25
POC 6	EDB 6	0.65	0.74	6.6	0.265	0.85	19.5

J-16483
10-19-2011
Revised 12-20-2011
Revised 3-13-2012
Revised 10-5-2012

Details and Specifications

Bio Clean Water Polisher Up Flow Media Filter

BIO CLEAN WATER POLISHER–UP FLOW MEDIA FILTER 5–10–84

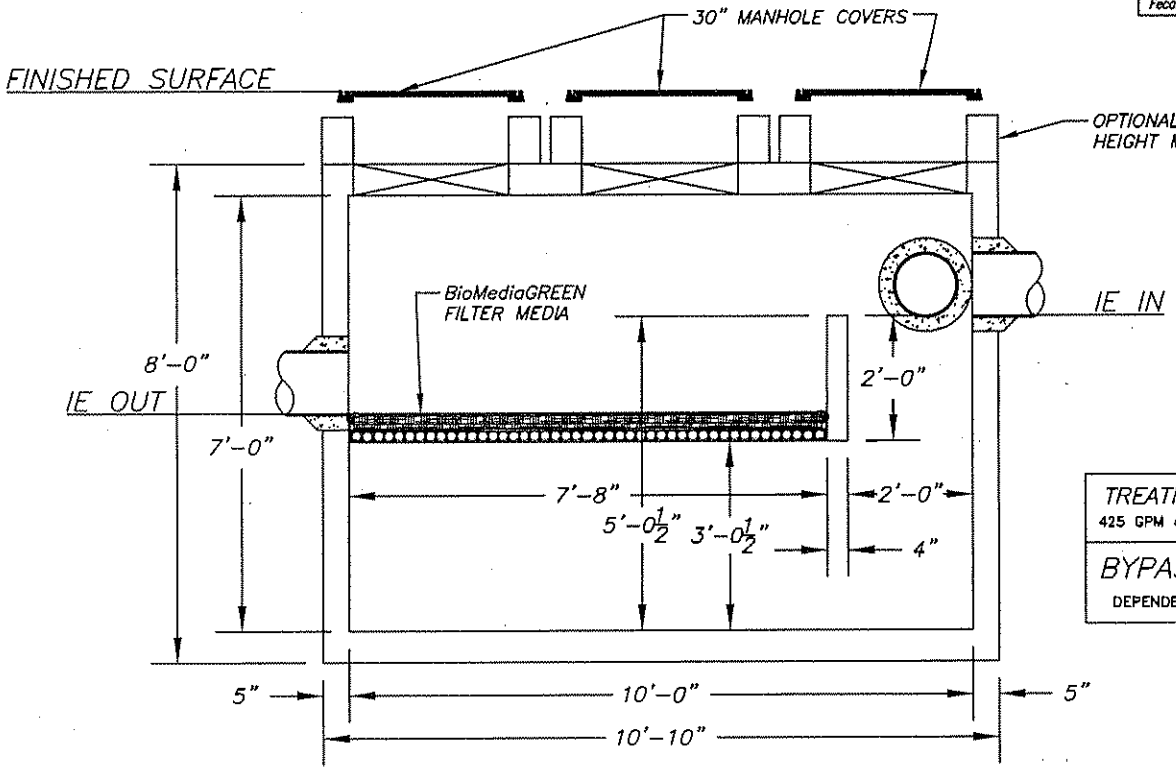


MEDIA SURFACE AREA

TOTAL = 38.33 SQ FT

BioMediaGREEN

BIOMEDIA GREEN TESTED REMOVAL EFFICIENCIES	
Total Suspended Solids "Sil–Co–Sil 106"	85%
Total Phosphorus	70%
Ortho Phosophorus	42%
Dissolved Copper	79%
Dissolved Lead	98%
Dissolved Zinc	78%
Dissolved Mercury	71%
Oils & Grease	91%
TPH	100%
Turbidity	99%
Fecal Coliform	68%



TREATMENT FLOW RATE
425 GPM or 0.95 CFS (includes safety factor of 4)

BYPASS FLOW RATE
DEPENDENT OF PIPE SIZE "VARIES"

CAPACITY
150 CUBIC FEET

NOTES:

1. CONCRETE 28 DAY COMPRESSIVE STRENGTH fc=5,000 PSI.
2. REINFORCING: ASTM A–615, GRADE 60.
3. SUPPORTS PARKWAY LOADING AS INDICATED BY AASHTO.
4. JOINT SEALANT: BUTYL RUBBER SS–S–00210
5. ALL WALLS ARE 6" THICK, TOP AND BOTTOM ARE 8" THICK.
6. BIO CLEAN WILL SUPPLY LIDS

5 YEAR MANUFACTURERS WARRANTY
PATENTED
ALL FILTER SCREENS ARE STAINLESS STEEL

BIO CLEAN® ENVIRONMENTAL SERVICES, INC.

Bio Clean Environmental
PO Box 869
Oceanside CA 92049
TEL. 760–433–7640 FAX 760–433–3176

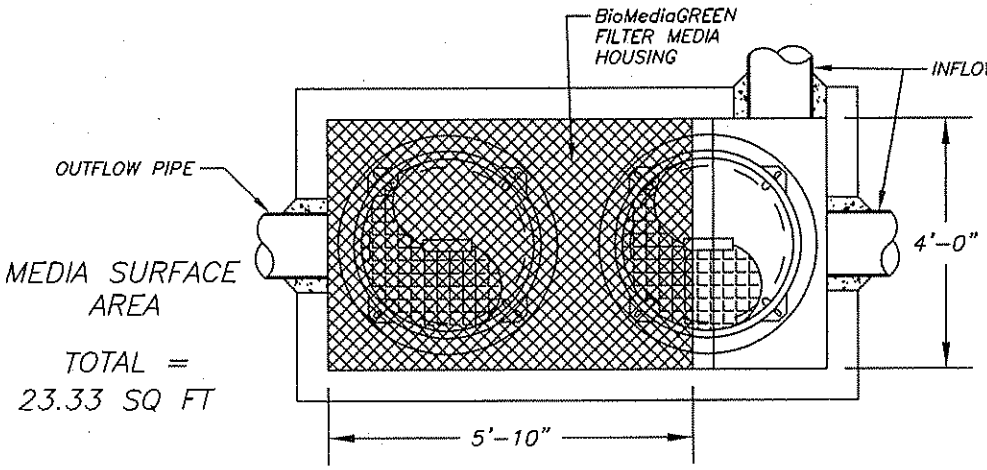
WATER POLISHER 5–10–84

DATE: 12/16/11 | SCALE: SF = NTS

DRAFTER: | UNITS = INCHES

PROJECT:	
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:

BIO CLEAN WATER POLISHER–UP FLOW MEDIA FILTER 4–8–84



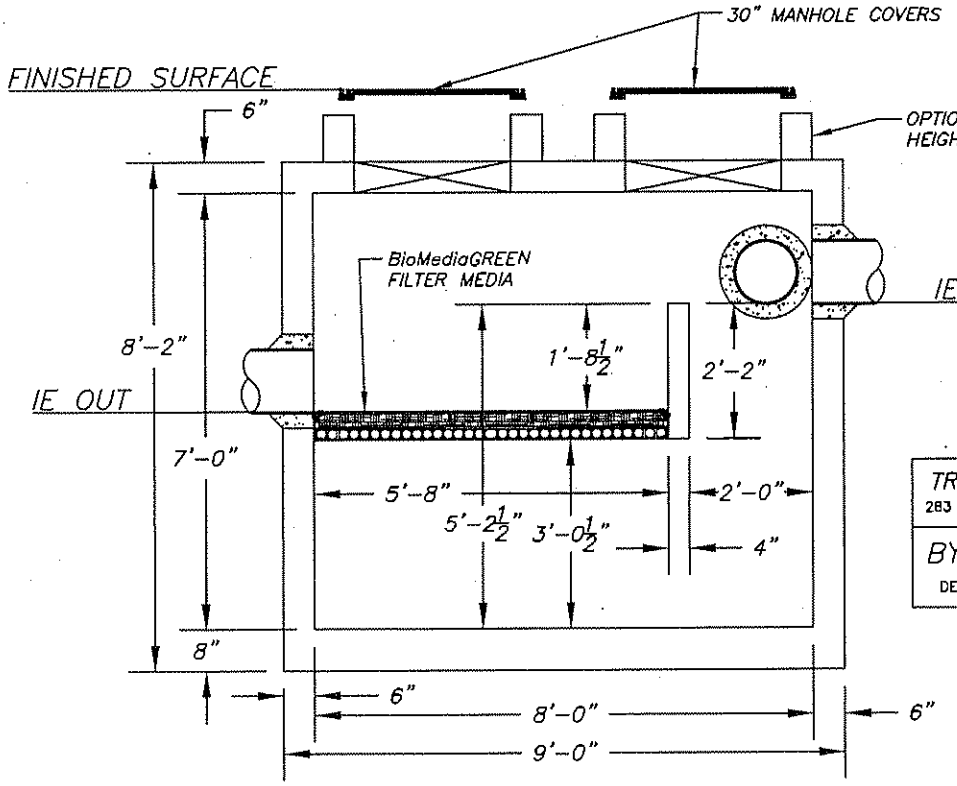
MEDIA SURFACE AREA

TOTAL = 23.33 SQ FT

BioMediaGREEN

BIOMEDIA GREEN TESTED REMOVAL EFFICIENCIES

Total Suspended Solids "Sil–Co–Sil 106"	85%
Total Phosphorus	70%
Ortho Phosophorus	42%
Dissolved Copper	79%
Dissolved Lead	98%
Dissolved Zinc	78%
Dissolved Mercury	71%
Oils & Grease	91%
TPH	100%
Turbidity	99%
Fecal Coliform	68%



TREATMENT FLOW RATE
283 GPM or 0.63 CFS (Includes safety factor of 4)

BYPASS FLOW RATE
DEPENDENT OF PIPE SIZE "VARIES"

CAPACITY
96 CUBIC FEET

NOTES:

1. CONCRETE 28 DAY COMPRESSIVE STRENGTH fc=5,000 PSI.
2. REINFORCING: ASTM A–615, GRADE 60.
3. SUPPORTS PARKWAY LOADING AS INDICATED BY AASHTO.
4. JOINT SEALANT: BUTYL RUBBER SS–S–00210
5. ALL WALLS ARE 6" THICK, TOP AND BOTTOM ARE 8" THICK.
6. BIO CLEAN WILL SUPPLY LIDS

5 YEAR MANUFACTURERS WARRANTY
PATENTED
ALL FILTER SCREENS ARE STAINLESS STEEL

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TEL. 760–433–7640 FAX 760–433–3176

WATER POLISHER 4–8–84

DATE: 12/16/11 | SCALE:SF = NTS

DRAFTER: | UNITS =INCHES

PROJECT:	
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:

Water Quality Draw Down Calculations

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*                JUN   1998             *
*             VERSION 4.1               *
*                                       *
*  RUN DATE   12MAR12  TIME  09:06:00   *
*                                       *
*****************************************
```


```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```


```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
               1    ID   QUARRY CREEK
               2    ID   J-16483
               3    ID   POST-PROJECT CONDITION
               4    ID   WATER QUALITY BASIN DRAWDOWN TIME CALCULATIONS
               5    ID   EXTENDED BIORETENTION BASIN 1
*** FREE ***
               6    IT      15 01JAN90    1200      500
               7    IO       5        1

               8    KK  BASIN1
               9    KM   SV-SE-SQ RELATIONSHIP FROM SDHM OUTPUT
              10    KO       0        0        0        0       21
              11    RS       1     STOR     .527
              12    SV       0     .069     .214     .399     .544
              13    SE       0    0.222    0.667     1.20     1.60
              14    SQ       0      .45      .77     1.04      1.2
              15    ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
LINE (V) ROUTING (---->) DIVERSION OR PUMP FLOW

NO. (.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW

*** HEC1 ERROR 4 *** NO HYDROGRAPHS AVAILABLE TO ROUTE
V
V
8 BASIN1

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1 ERRORS IN STREAM SYSTEM

```
*****************************************                    ***************************************
*                                       *                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *    U.S. ARMY CORPS OF ENGINEERS
*              JUN   1998               *                    *    HYDROLOGIC ENGINEERING CENTER
*           VERSION 4.1                 *                    *          609 SECOND STREET
*                                       *                    *       DAVIS, CALIFORNIA 95616
*  RUN DATE   12MAR12  TIME  09:06:00   *                    *           (916) 756-1104
*                                       *                    *
*****************************************                    ***************************************


                  QUARRY CREEK
                  J-16483
                  POST-PROJECT CONDITION
                  WATER QUALITY BASIN DRAWDOWN TIME CALCULATIONS
                  EXTENDED BIORETENTION BASIN 1

 7 IO         OUTPUT CONTROL VARIABLES
                    IPRNT            5  PRINT CONTROL
                    IPLOT            1  PLOT CONTROL
                    QSCAL           0.  HYDROGRAPH PLOT SCALE

   IT         HYDROGRAPH TIME DATA
                    NMIN            15  MINUTES IN COMPUTATION INTERVAL
                    IDATE       1JAN90  STARTING DATE
                    ITIME         1200  STARTING TIME
                       NQ          500  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE       6JAN90  ENDING DATE
                   NDTIME         1645  ENDING TIME
                    ICENT           19  CENTURY MARK

              COMPUTATION INTERVAL      .25 HOURS
                   TOTAL TIME BASE   124.75 HOURS

      ENGLISH UNITS
           DRAINAGE AREA          SQUARE MILES
           PRECIPITATION DEPTH    INCHES
           LENGTH, ELEVATION      FEET
           FLOW                   CUBIC FEET PER SECOND
           STORAGE VOLUME         ACRE-FEET
           SURFACE AREA           ACRES
           TEMPERATURE            DEGREES FAHRENHEIT


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** **


          **************
          *            *
  8 KK    *   BASIN1   *
          *            *
          **************

 10 KO        OUTPUT CONTROL VARIABLES
                    IPRNT            5  PRINT CONTROL
                    IPLOT            I  PLOT CONTROL
```

QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	21	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	500	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.250	TIME INTERVAL IN HOURS

RUNOFF SUMMARY

FLOW IN CUBIC FEET PER SECOND

TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
ROUTED TO	BASIN1	1.	.00	1.	0.	0.	.00	1.55	.00

*** NORMAL END OF HEC-1 ***

BASIN1 151200 1JAN90 0 1 1 500 .000

1.181	1.155	1.129	1.103	1.078	1.054	1.027	.997	.967	.938
.910	.883	.857	.832	.807	.783	.755	.721	.689	.658
.629	.601	.574	.548	.524	.501	.478	.457	.412	.360
.314	.275	.240	.210	.183	.160	.140	.122	.107	.093
.082	.071	.062	.054	.048	.042	.036	.032	.028	.024
.021	.018	.016	.014	.012	.011	.009	.008	.007	.006
.005	.005	.004	.004	.003	.003	.002	.002	.002	.002
.001	.001	.001	.001	.001	.001	.001	.001	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
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.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
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.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998             *
*          VERSION 4.1              *
*                                   *
*  RUN DATE   05OCT12  TIME  10:48:31   *
*                                   *
*************************************
```

```
*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*        609 SECOND STREET          *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X         X     X       XX
X     X  X         X             X
XXXXXXX  XXXX      X       XXXXX X
X     X  X         X             X
X     X  X         X     X       X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBROUTINE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                        *DIAGRAM
                1       ID   QUARRY CREEK
                2       ID   J-16483
                3       ID   POST-PROJECT CONDITION
                4       ID   WATER QUALITY BASIN DRAWDOWN TIME CALCULATIONS
                5       ID   EXTENDED BIORETENTION BASIN 3-2
*** FREE ***
                6       IT     15 01JAN90    1200     500
                7       IO      5     1

                8       KKBASIN3-2
                9       KO      0     0       0       0      21
               10       RS      1   STOR     .531
               11       SV      0    .142    .267    .400    .540
               12       SE      0    .49     .89    1.29    1.69
               13       SQ      0    .56     .75     .9     1.03
               14       ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (---->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<----) RETURN OF DIVERTED OR PUMPED FLOW

*** HEC1 ERROR 4 *** NO HYDROGRAPHS AVAILABLE TO ROUTE
                    V
                    V
    8     BASIN3-2

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

1 ERRORS IN STREAM SYSTEM


```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998             *
*          VERSION 4.1              *
*                                   *
*  RUN DATE   05OCT12  TIME  10:48:31   *
*                                   *
*************************************
```

```
*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*        609 SECOND STREET          *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
```


QUARRY CREEK
J-16483
POST-PROJECT CONDITION
WATER QUALITY BASIN DRAWDOWN TIME CALCULATIONS
EXTENDED BIORETENTION BASIN 3-2

```
    7 IO        OUTPUT CONTROL VARIABLES
                     IPRNT         5  PRINT CONTROL
                     IPLOT         1  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

      IT        HYDROGRAPH TIME DATA
                     NMIN         15  MINUTES IN COMPUTATION INTERVAL
                    IDATE     1JAN90  STARTING DATE
                    ITIME       1200  STARTING TIME
                       NQ        500  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE     6JAN90  ENDING DATE
                   NDTIME       1645  ENDING TIME
                    ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL     .25 HOURS
```

TOTAL TIME BASE 124.75 HOURS

```
ENGLISH UNITS
     DRAINAGE AREA          SQUARE MILES
     PRECIPITATION DEPTH    INCHES
     LENGTH, ELEVATION      FEET
     FLOW                   CUBIC FEET PER SECOND
     STORAGE VOLUME         ACRE-FEET
     SURFACE AREA           ACRES
     TEMPERATURE            DEGREES FAHRENHEIT
```

*** ***

```
                *************
                *           *
    8 KK        *  BASIN3-2 *
                *           *
                *************

    9 KO        OUTPUT CONTROL VARIABLES
                     IPRNT         5  PRINT CONTROL
                     IPLOT         1  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH         0  PUNCH COMPUTED HYDROGRAPH
                      IOUT        21  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1         1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2       500  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT      .250  TIME INTERVAL IN HOURS
```

1

RUNOFF SUMMARY.
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
ROUTED TO	BASIN3-2	1.	.00	1.	0.	0.	.00	1.66	.00

*** NORMAL END OF HEC-1 ***

BASIN3-2   151200 1JAN90 0 1 1 500   .000

1.022	1.002	.983	.964	.946	.928	.911	.892	.871	.851
.832	.812	.794	.775	.758	.737	.714	.692	.671	.650
.630	.610	.591	.573	.548	.505	.466	.429	.396	.365
.336	.310	.286	.263	.243	.224	.206	.190	.175	.161
.149	.137	.126	.116	.107	.099	.091	.084	.077	.071
.066	.061	.056	.052	.048	.044	.040	.037	.034	.032
.029	.027	.025	.023	.021	.019	.018	.016	.015	.014
.013	.012	.011	.010	.009	.009	.008	.007	.007	.006
.006	.005	.005	.004	.004	.004	.003	.003	.003	.003
.003	.002	.002	.002	.002	.002	.002	.001	.001	.001
.001	.001	.001	.001	.001	.001	.001	.001	.001	.001
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
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.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998             *
*          VERSION 4.1              *
*                                   *
*  RUN DATE   05OCT12  TIME  10:51:16   *
*                                   *
*************************************
```

```
*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*        609 SECOND STREET          *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX  XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1EW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973 STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                        *DIAGRAM
              1         ID   QUARRY CREEK
              2         ID   J-16483
              3         ID   POST-PROJECT CONDITION
              4         ID   WATER QUALITY BASIN DRAWDOWN TIME CALCULATIONS
              5         ID   EXTENDED BIORETENTION BASIN 3-3
*** FREE ***
              6         IT     15 01JAN90    1200     500
              7         IO      5         1

              8         KKBASIN3-3
              9         KO      0         0       0       0      21
             10         RS      1    STOR    .285
             11         SV      0    .053    .096    .193    .294
             12         SE      0     .36     .62    1.16    1.64
             13         SQ      0     .25     .33     .45     .54
             14         ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (---->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<----) RETURN OF DIVERTED OR PUMPED FLOW

*** HEC1 ERROR 6 *** NO HYDROGRAPHS AVAILABLE TO ROUTE
                 V
                 V
    8    BASIN3-3

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

1 ERRORS IN STREAM SYSTEM

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998             *
*          VERSION 4.1              *
*                                   *
*  RUN DATE   05OCT12  TIME  10:51:16   *
*                                   *
*************************************
```

```
*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*        609 SECOND STREET          *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************
```

QUARRY CREEK
J-16483
POST-PROJECT CONDITION
WATER QUALITY BASIN DRAWDOWN TIME CALCULATIONS
EXTENDED BIORETENTION BASIN 3-3

```
    7 IO          OUTPUT CONTROL VARIABLES
                      IPRNT         5  PRINT CONTROL
                      IPLOT         1  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

      IT          HYDROGRAPH TIME DATA
                      NMIN         15  MINUTES IN COMPUTATION INTERVAL
                     IDATE     1JAN90  STARTING DATE
                     ITIME       1200  STARTING TIME
                        NQ        500  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     6JAN90  ENDING DATE
                    NDTIME       1645  ENDING TIME
                    ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL      .25 HOURS
                      TOTAL TIME BASE  124.75 HOURS

            ENGLISH UNITS
                DRAINAGE AREA          SQUARE MILES
                PRECIPITATION DEPTH    INCHES
                LENGTH, ELEVATION      FEET
                FLOW                   CUBIC FEET PER SECOND
                STORAGE VOLUME         ACRE-FEET
                SURFACE AREA           ACRES
                TEMPERATURE            DEGREES FAHRENHEIT

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

                  ***********
                  *         *
    8 KK          * BASIN3-3 *
                  *         *
                  ***********

    9 KO          OUTPUT CONTROL VARIABLES
                      IPRNT         5  PRINT CONTROL
                      IPLOT         1  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                      IPNCH         0  PUNCH COMPUTED HYDROGRAPH
                       IOUT        21  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1         1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2       500  LAST ORDINATE PUNCHED OR SAVED
                     TSMINT      .250  TIME INTERVAL IN HOURS
```

1 RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	ROUTED TO									
+		BASIN3-3	1.	.00	0.	0.	0.	.00		
+									1.60	.00

*** NORMAL END OF HEC-1 ***

BASIN3-3 151200 1JAN90 0 1 1 500 .000

.532	.522	.513	.503	.494	.485	.476	.468	.459	.451
.440	.429	.418	.407	.397	.387	.377	.368	.358	.349
.340	.332	.320	.308	.297	.285	.275	.264	.254	.237
.215	.195	.177	.160	.146	.132	.120	.109	.099	.089
.081	.074	.067	.061	.055	.050	.045	.041	.037	.034
.031	.028	.025	.023	.021	.019	.017	.015	.014	.013
.012	.010	.009	.009	.008	.007	.006	.006	.005	.005
.004	.004	.004	.003	.003	.003	.002	.002	.002	.002
.002	.001	.001	.001	.001	.001	.001	.001	.001	.001
.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
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.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
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*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*                JUN   1998             *
*             VERSION 4.1               *
*                                       *
*  RUN DATE   12MAR12  TIME  09:14:20   *
*                                       *
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*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```


```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
               1    ID   QUARRY CREEK
               2    ID   J-16483
               3    ID   POST-PROJECT CONDITION
               4    ID   WATER QUALITY BASIN DRAWDOWN TIME CALCULATIONS
               5    ID   EXTENDED BIORETENTION BASIN 3-7
*** FREE ***
               6    IT      15 01JAN90    1200      500
               7    IO       5        1

               8    KKBASIN3-7
               9    KO       0        0        0        0       21
              10    RS       1     STOR      .06
              11    SV       0     .024     .037     .052     .068
              12    SE       0     1.16     1.64     2.18     2.67
              13    SQ       0      .11      .14      .17      .49
              14    ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW

NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW

*** HEC1 ERROR 4 *** NO HYDROGRAPHS AVAILABLE TO ROUTE
V
V
8 BASIN3-7

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1 ERRORS IN STREAM SYSTEM

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*           VERSION 4.1                 *
*                                       *
* RUN DATE   12MAR12  TIME  09:14:20    *
*                                       *
*****************************************
```

```
**************************************
*
*    U.S. ARMY CORPS OF ENGINEERS
*    HYDROLOGIC ENGINEERING CENTER
*         609 SECOND STREET
*       DAVIS, CALIFORNIA 95616
*           (916) 756-1104
*
**************************************
```

```
                    QUARRY CREEK
                    J-16483
                    POST-PROJECT CONDITION
                    WATER QUALITY BASIN DRAWDOWN TIME CALCULATIONS
                    EXTENDED BIORETENTION BASIN 3-7

  7 IO        OUTPUT CONTROL VARIABLES
                   IPRNT          5  PRINT CONTROL
                   IPLOT          1  PLOT CONTROL
                   QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT         HYDROGRAPH TIME DATA
                    NMIN         15  MINUTES IN COMPUTATION INTERVAL
                   IDATE     1JAN90  STARTING DATE
                   ITIME       1200  STARTING TIME
                      NQ        500  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE     6JAN90  ENDING DATE
                  NDTIME       1645  ENDING TIME
                   ICENT         19  CENTURY MARK

              COMPUTATION INTERVAL     .25 HOURS
                   TOTAL TIME BASE  124.75 HOURS

        ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** **

         **************
         *            *
  8 KK   *  BASIN3-7  *
         *            *
         **************

  9 KO        OUTPUT CONTROL VARIABLES
                   IPRNT          5  PRINT CONTROL
                   IPLOT          1  PLOT CONTROL
```

QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	21	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	500	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.250	TIME INTERVAL IN HOURS

RUNOFF SUMMARY

FLOW IN CUBIC FEET PER SECOND

TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
ROUTED TO	BASIN3-7	0.	.00	0.	0.	0.	.00	2.42	.00

*** NORMAL END OF HEC-I ***

BASIN3-7 151200 1JAN90 0 1 1 500 .000

.330	.217	.167	.160	.154	.147	.141	.135	.129	.123
.117	.112	.103	.094	.085	.077	.070	.064	.058	.053
.048	.044	.040	.036	.033	.030	.027	.025	.023	.021
.019	.017	.015	.014	.013	.012	.011	.010	.009	.008
.007	.007	.006	.005	.005	.005	.004	.004	.003	.003
.003	.003	.002	.002	.002	.002	.002	.001	.001	.001
.001	.001	.001	.001	.001	.001	.001	.001	.001	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
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.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
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.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
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*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*                JUN   1998             *
*             VERSION 4.1               *
*                                       *
*  RUN DATE   12MAR12  TIME  09:15:52   *
*                                       *
*****************************************
```


```
************************************
*                                  *
*    U.S. ARMY CORPS OF ENGINEERS  *
*    HYDROLOGIC ENGINEERING CENTER *
*          609 SECOND STREET       *
*       DAVIS, CALIFORNIA 95616    *
*           (916) 756-1104         *
*                                  *
************************************
```


```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
               1    ID   QUARRY CREEK
               2    ID   J-16483
               3    ID   POST-PROJECT CONDITION
               4    ID   WATER QUALITY BASIN DRAWDOWN TIME CALCULATIONS
               5    ID   EXTENDED BIORETENTION BASIN 4
*** FREE ***
               6    IT      15 01JAN90    1200     500
               7    IO       5        1

               8    KK  BASIN4
               9    KO       0        0        0        0       21
              10    RS       1     STOR    1.081
              11    SV       0     .342      .74     .999    1.132
              12    SE       0      .67     1.39     1.83     2.06
              13    SQ       0      1.2     1.74      2.0     2.11
              14    ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
LINE (V) ROUTING (---->) DIVERSION OR PUMP FLOW

NO. (.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW

*** HEC1 ERROR 4 *** NO HYDROGRAPHS AVAILABLE TO ROUTE

V

V

8 BASIN4

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1 ERRORS IN STREAM SYSTEM

QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	21	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	500	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.250	TIME INTERVAL IN HOURS

RUNOFF SUMMARY

FLOW IN CUBIC FEET PER SECOND

TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
ROUTED TO	BASIN4	2.	.00	2.	1.	0.	.00	1.97	.00

*** NORMAL END OF HEC-1 ***

E

BASIN4   151200   1JAN90 0 1 1 500   .000

2.068	2.033	1.998	1.957	1.917	1.877	1.839	1.801	1.764	1.724
1.676	1.630	1.585	1.541	1.498	1.457	1.417	1.377	1.339	1.302
1.266	1.231	1.193	1.110	1.032	.960	.893	.830	.772	.718
.668	.621	.578	.537	.500	.465	.432	.402	.374	.348
.323	.301	.280	.260	.242	.225	.209	.195	.181	.168
.157	.146	.135	.126	.117	.109	.101	.094	.088	.082
.076	.071	.066	.061	.057	.053	.049	.046	.042	.039
.037	.034	.032	.030	.027	.026	.024	.022	.021	.019
.018	.017	.015	.014	.013	.012	.012	.011	.010	.009
.009	.008	.007	.007	.006	.006	.006	.005	.005	.004
.004	.004	.004	.003	.003	.003	.003	.003	.002	.002
.002	.002	.002	.002	.002	.001	.001	.001	.001	.001
.001	.001	.001	.001	.001	.001	.001	.001	.001	.001
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1*****************************************                        *****************************************
*                                       *                        *                                       *
*   FLOOD HYDROGRAPH PACKAGE   (HEC-1)  *                        *   U.S. ARMY CORPS OF ENGINEERS        *
*            JUN   1998                 *                        *   HYDROLOGIC ENGINEERING CENTER       *
*          VERSION 4.1                  *                        *        609 SECOND STREET              *
*                                       *                        *     DAVIS, CALIFORNIA 95616           *
*  RUN DATE   05OCT12  TIME  10:52:21   *                        *         (916) 756-1104                *
*                                       *                        *                                       *
*****************************************                        *****************************************


                    X     X  XXXXXXX   XXXXX        X
                    X     X  X        X     X      XX
                    X     X  X        X             X
                    XXXXXXX  XXXX     X     XXXXX   X
                    X     X  X        X             X
                    X     X  X        X     X       X
                    X     X  XXXXXXX   XXXXX       XXX


 THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

 THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
 THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
 NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
 DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
 KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                     HEC-1 INPUT                                            PAGE  1

      LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

                 *DIAGRAM
         1       ID   QUARRY CREEK
         2       ID   J-16483
         3       ID   POST-PROJECT CONDITION
         4       ID   WATER QUALITY BASIN DRAWDOWN TIME CALCULATIONS
         5       ID   EXTENDED BIORETENTION BASIN 5
 *** FREE ***
         6       IT       15 01JAN90    1200     500
         7       IO        5       1

         8       KK  BASIN5
         9       KO        0       0       0       0      21
        10       RS        1    STOR    .252
        11       SV        0    .097    .167    .239    .255
        12       SE        0     .36     .61     .86     .92
        13       SQ        0     .39     .51     .61     .63
        14       ZZ
1
           SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

 *** HEC1 ERROR 4 *** NO HYDROGRAPHS AVAILABLE TO ROUTE
               V
               V
    8       BASIN5

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION

        1 ERRORS IN STREAM SYSTEM
1*****************************************                        *****************************************
*                                       *                        *                                       *
*   FLOOD HYDROGRAPH PACKAGE   (HEC-1)  *                        *   U.S. ARMY CORPS OF ENGINEERS        *
*            JUN   1998                 *                        *   HYDROLOGIC ENGINEERING CENTER       *
*          VERSION 4.1                  *                        *        609 SECOND STREET              *
*                                       *                        *     DAVIS, CALIFORNIA 95616           *
*  RUN DATE   05OCT12  TIME  10:52:21   *                        *         (916) 756-1104                *
*                                       *                        *                                       *
*****************************************                        *****************************************


                 QUARRY CREEK
                 J-16483
                 POST-PROJECT CONDITION
                 WATER QUALITY BASIN DRAWDOWN TIME CALCULATIONS
                 EXTENDED BIORETENTION BASIN 5

   7 IO         OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           1  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT         HYDROGRAPH TIME DATA
                       NMIN          15  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1JAN90  STARTING DATE
                      ITIME        1200  STARTING TIME
                         NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      6JAN90  ENDING DATE
                     NDTIME        1645  ENDING TIME
                      ICENT          19  CENTURY MARK

                   COMPUTATION INTERVAL     .25 HOURS
                        TOTAL TIME BASE  124.75 HOURS

        ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT

 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

              **************
              *            *
    8 KK      *   BASIN5   *
              *            *
              **************

    9 KO        OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           1  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT        .250  TIME INTERVAL IN HOURS

1
                                             RUNOFF SUMMARY
                                       FLOW IN CUBIC FEET PER SECOND
                                     TIME IN HOURS,  AREA IN SQUARE MILES

                                         PEAK    TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN    MAXIMUM    TIME OF
          OPERATION        STATION       FLOW     PEAK                                             AREA     STAGE    MAX STAGE
 +                                                            6-HOUR     24-HOUR     72-HOUR

          ROUTED TO
 +                         BASIN5          1.      .00          0.          0.          0.          .00
 +                                                                                                            .91        .00

 *** NORMAL END OF HEC-1 ***
```

```
BASIN5   151200  1JAN90 0 1 1 500      .000
     .626      .610      .593      .576      .560      .544      .529      .514      .497      .479
     .463      .447      .431      .416      .402      .385      .354      .326      .300      .276
     .254      .234      .215      .198      .182      .168      .154      .142      .131      .120
     .111      .102      .094      .086      .079      .073      .067      .062      .057      .052
     .048      .044      .041      .038      .035      .032      .029      .027      .025      .023
     .021      .019      .018      .016      .015      .014      .013      .012      .011      .010
     .009      .008      .008      .007      .007      .006      .006      .005      .005      .004
     .004      .004      .003      .003      .003      .003      .002      .002      .002      .002
     .002      .002      .001      .001      .001      .001      .001      .001      .001      .001
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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   05OCT12  TIME  10:53:16   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*        609 SECOND STREET              *
*     DAVIS, CALIFORNIA 95616           *
*          (916) 756-1104               *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X       XX
X     X  X              X      X X
XXXXXXX  XXXX           X        X
X     X  X              X        X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX       XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                        *DIAGRAM
              1         ID   QUARRY CREEK
              2         ID   J-16483
              3         ID   POST-PROJECT CONDITION
              4         ID   WATER QUALITY BASIN DRAWDOWN TIME CALCULATIONS
              5         ID   EXTENDED BIORETENTION BASIN 6
*** FREE ***
              6         IT      15 01JAN90    1200     500
              7         IO       5         1

              8         KK  BASINS
              9         KO       0         0       0       0      21
             10         RS       1    STOR    .265
             11         SV       0    .097    .141    .202    .273
             12         SE       0     .62     .89    1.24    1.64
             13         SQ       0     .33     .40     .47     .54
             14         ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

*** HSC1 ERROR 4 *** NO HYDROGRAPHS AVAILABLE TO ROUTE
                 V
                 V
    8       BASINS

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

0 ERRORS IN STREAM SYSTEM

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   05OCT12  TIME  10:53:16   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*        609 SECOND STREET              *
*     DAVIS, CALIFORNIA 95616           *
*          (916) 756-1104               *
*                                       *
*****************************************
```

QUARRY CREEK
J-16483
POST-PROJECT CONDITION
WATER QUALITY BASIN DRAWDOWN TIME CALCULATIONS
EXTENDED BIORETENTION BASIN 6

```
  7 IO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          1  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                     NMIN          15  MINUTES IN COMPUTATION INTERVAL
                    IDATE      1JAN90  STARTING DATE
                    ITIME        1200  STARTING TIME
                       NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      6JAN90  ENDING DATE
                    NDTIME        1645  ENDING TIME
                    ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL      .25 HOURS
                      TOTAL TIME BASE  124.75 HOURS

          ENGLISH UNITS
              DRAINAGE AREA         SQUARE MILES
              PRECIPITATION DEPTH   INCHES
              LENGTH, ELEVATION     FEET
              FLOW                  CUBIC FEET PER SECOND
```

```
              STORAGE VOLUME        ACRE-FEET
              SURFACE AREA          ACRES
              TEMPERATURE           DEGREES FAHRENHEIT
```

*** ***

```
*************
*           *
*           *
*  BASINS   *
*           *
*           *
*************
```

```
  9 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          1  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         21  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        500  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .250  TIME INTERVAL IN HOURS
```

1 RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	ROUTED TO									
+		BASINS	1.	.00	0.	0.	0.	.00		
+									1.59	.00

*** NORMAL END OF HEC-1 ***

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BASIN5   151200  1JAN90 0 1 1 500      .000
        .532        .521        .511        .501        .490        .481        .471        .460        .449        .439
        .428        .418        .409        .399        .386        .373        .361        .350        .338        .324
        .302        .282        .263        .245        .228        .213        .198        .185        .172        .161
        .150        .139        .130        .121        .113        .105        .098        .091        .085        .079
        .074        .069        .064        .060        .056        .052        .049        .045        .042        .039
        .037        .034        .032        .030        .028        .026        .024        .022        .021        .019
        .018        .017        .016        .015        .014        .013        .012        .011        .010        .010
        .009        .008        .008        .007        .007        .006        .006        .005        .005        .005
        .004        .004        .004        .004        .003        .003        .003        .003        .003        .002
        .002        .002        .002        .002        .002        .002        .001        .001        .001        .001
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APPENDIX D

SDHM Output and Support Material

SDHM2011
PROJECT REPORT

Project Name: QC_POC1
Site Name : Quarry Creek
Site Address:
City :
Report Date : 3/5/2012
Gage : OCEANSID
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version : 2012/03/01

PREDEVELOPED LAND USE

Name : POC 1
Bypass: No

GroundWater: No

Pervious Land Use	Acres
A,Grass,FLAT(0-5%)	4.97
A,Grass,MOD(5-10%)	.23
A,Grass,STEEP(10-20	2.57
D,Grass,FLAT(0-5%)	1.21
D,Grass,MOD(5-10%)	.62
D,Grass,STEEP(10-20	1.9

Impervious Land Use	Acres
IMPERVIOUS-FLAT	1.6
IMPERVIOUS-MOD	1.22

Element Flows To:
Surface Interflow Groundwater

MITIGATED LAND USE

Name : POC 1
Bypass: No

GroundWater: No

Pervious Land Use	Acres
A,Grass,FLAT(0-5%)	1.76
A,Grass,STEEP(10-20	2.03
D,Grass,FLAT(0-5%)	.31
D,Grass,STEEP(10-20	1.61

Impervious Land Use	Acres
IMPERVIOUS-FLAT	7.95
IMPERVIOUS-MOD	0.67

Element Flows To:

Surface	Interflow	Groundwater
Pond 1	Pond 1	

Name : Pond 1
Bottom Length: 385.00 ft.
Bottom Width: 35.00 ft.
Depth : 4 ft.
Volume at riser head : 1.1144 acre-ft.
Side slope 1: 2 To 1
Side slope 2: 2 To 1
Side slope 3: 2 To 1
Side slope 4: 2 To 1

Discharge Structure

Riser Height: 3 ft.
Riser Diameter: 18 in.
Notch Type : Rectangular
Notch Width : 1.500 ft.
Notch Height: 0.669 ft.
Orifice 1 Diameter: 6 in. **Elevation:** 0 ft.

Element Flows To:

Outlet 1	Outlet 2

Pond Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.309	0.000	0.000	0.000
0.0444	0.311	0.013	0.199	0.000
0.0889	0.312	0.027	0.281	0.000
0.1333	0.314	0.041	0.345	0.000
0.1778	0.316	0.055	0.398	0.000
0.2222	0.317	0.069	0.445	0.000
0.2667	0.319	0.083	0.488	0.000
0.3111	0.321	0.098	0.527	0.000
0.3556	0.323	0.112	0.563	0.000
0.4000	0.324	0.126	0.598	0.000
0.4444	0.326	0.141	0.630	0.000
0.4889	0.328	0.155	0.661	0.000
0.5333	0.330	0.170	0.690	0.000
0.5778	0.331	0.185	0.718	0.000
0.6222	0.333	0.200	0.745	0.000
0.6667	0.335	0.214	0.772	0.000
0.7111	0.337	0.229	0.797	0.000
0.7556	0.338	0.244	0.821	0.000

0.8000	0.340	0.259	0.845	0.000
0.8444	0.342	0.275	0.868	0.000
0.8889	0.343	0.290	0.891	0.000
0.9333	0.345	0.305	0.913	0.000
0.9778	0.347	0.321	0.934	0.000
1.0222	0.349	0.336	0.955	0.000
1.0667	0.350	0.352	0.976	0.000
1.1111	0.352	0.367	0.996	0.000
1.1556	0.354	0.383	1.016	0.000
1.2000	0.356	0.399	1.035	0.000
1.2444	0.357	0.415	1.054	0.000
1.2889	0.359	0.431	1.073	0.000
1.3333	0.361	0.447	1.091	0.000
1.3778	0.363	0.463	1.109	0.000
1.4222	0.364	0.479	1.127	0.000
1.4667	0.366	0.495	1.145	0.000
1.5111	0.368	0.511	1.162	0.000
1.5556	0.370	0.528	1.179	0.000
1.6000	0.372	0.544	1.196	0.000
1.6444	0.373	0.561	1.212	0.000
1.6889	0.375	0.578	1.228	0.000
1.7333	0.377	0.594	1.244	0.000
1.7778	0.379	0.611	1.260	0.000
1.8222	0.380	0.628	1.276	0.000
1.8667	0.382	0.645	1.291	0.000
1.9111	0.384	0.662	1.307	0.000
1.9556	0.386	0.679	1.322	0.000
2.0000	0.387	0.696	1.337	0.000
2.0444	0.389	0.714	1.351	0.000
2.0889	0.391	0.731	1.366	0.000
2.1333	0.393	0.748	1.381	0.000
2.1778	0.395	0.766	1.395	0.000
2.2222	0.396	0.784	1.409	0.000
2.2667	0.398	0.801	1.423	0.000
2.3111	0.400	0.819	1.437	0.000
2.3556	0.402	0.837	1.470	0.000
2.4000	0.404	0.855	1.555	0.000
2.4444	0.405	0.873	1.669	0.000
2.4889	0.407	0.891	1.805	0.000
2.5333	0.409	0.909	1.959	0.000
2.5778	0.411	0.927	2.130	0.000
2.6222	0.413	0.946	2.316	0.000
2.6667	0.414	0.964	2.515	0.000
2.7111	0.416	0.982	2.727	0.000
2.7556	0.418	1.001	2.951	0.000
2.8000	0.420	1.020	3.186	0.000
2.8444	0.422	1.038	3.432	0.000
2.8889	0.423	1.057	3.688	0.000
2.9333	0.425	1.076	3.954	0.000
2.9778	0.427	1.095	4.230	0.000
3.0222	0.429	1.114	4.425	0.000
3.0667	0.431	1.133	4.640	0.000
3.1111	0.432	1.152	4.942	0.000
3.1556	0.434	1.172	5.309	0.000
3.2000	0.436	1.191	5.731	0.000
3.2444	0.438	1.210	6.202	0.000
3.2889	0.440	1.230	6.716	0.000

3.3333	0.442	1.249	7.271	0.000
3.3778	0.443	1.269	7.863	0.000
3.4222	0.445	1.289	8.490	0.000
3.4667	0.447	1.309	9.151	0.000
3.5111	0.449	1.329	9.843	0.000
3.5556	0.451	1.349	10.56	0.000
3.6000	0.452	1.369	11.31	0.000
3.6444	0.454	1.389	12.09	0.000
3.6889	0.456	1.409	12.90	0.000
3.7333	0.458	1.430	13.73	0.000
3.7778	0.460	1.450	14.59	0.000
3.8222	0.462	1.470	15.47	0.000
3.8667	0.464	1.491	16.37	0.000
3.9111	0.465	1.512	17.30	0.000
3.9556	0.467	1.532	18.26	0.000
4.0000	0.469	1.553	19.23	0.000
4.0444	0.471	1.574	20.22	0.000

ANALYSIS RESULTS

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	2.59967
5 year	4.648867
10 year	6.222832
25 year	7.941296

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	1.288965
5 year	1.975267
10 year	3.678746
25 year	4.395659

POC #1
The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
1.2998	127	111	87	Pass
1.3496	123	92	74	Pass
1.3993	114	67	58	Pass
1.4490	105	56	53	Pass
1.4987	97	52	53	Pass
1.5485	92	45	48	Pass
1.5982	89	41	46	Pass
1.6479	85	36	42	Pass
1.6977	85	34	40	Pass
1.7474	82	31	37	Pass
1.7971	78	30	38	Pass

1.8468	77	28	36	Pass
1.8966	71	26	36	Pass
1.9463	68	26	38	Pass
1.9960	63	24	38	Pass
2.0457	56	23	41	Pass
2.0955	55	23	41	Pass
2.1452	52	22	42	Pass
2.1949	49	22	44	Pass
2.2447	48	20	41	Pass
2.2944	46	20	43	Pass
2.3441	44	19	43	Pass
2.3938	43	18	41	Pass
2.4436	40	17	42	Pass
2.4933	36	17	47	Pass
2.5430	36	17	47	Pass
2.5927	35	17	48	Pass
2.6425	34	15	44	Pass
2.6922	32	15	46	Pass
2.7419	31	14	45	Pass
2.7917	28	12	42	Pass
2.8414	28	12	42	Pass
2.8911	27	11	40	Pass
2.9408	23	11	47	Pass
2.9906	22	10	45	Pass
3.0403	22	10	45	Pass
3.0900	20	10	50	Pass
3.1397	20	10	50	Pass
3.1895	20	10	50	Pass
3.2392	20	10	50	Pass
3.2889	20	10	50	Pass
3.3387	20	10	50	Pass
3.3884	18	10	55	Pass
3.4381	18	9	50	Pass
3.4878	18	9	50	Pass
3.5376	17	9	52	Pass
3.5873	17	9	52	Pass
3.6370	17	9	52	Pass
3.6867	17	8	47	Pass
3.7365	17	8	47	Pass
3.7862	16	8	50	Pass
3.8359	16	7	43	Pass
3.8857	16	6	37	Pass
3.9354	14	5	35	Pass
3.9851	14	5	35	Pass
4.0348	13	5	38	Pass
4.0846	13	5	38	Pass
4.1343	13	4	30	Pass
4.1840	13	4	30	Pass
4.2337	12	3	25	Pass
4.2835	12	3	25	Pass
4.3332	11	3	27	Pass
4.3829	11	3	27	Pass
4.4327	11	3	27	Pass
4.4824	11	2	18	Pass
4.5321	10	2	20	Pass
4.5818	10	2	20	Pass
4.6316	9	2	22	Pass

4.6813	9	2	22	Pass
4.7310	8	2	25	Pass
4.7807	8	2	25	Pass
4.8305	7	2	28	Pass
4.8802	7	2	28	Pass
4.9299	6	2	33	Pass
4.9797	6	2	33	Pass
5.0294	6	2	33	Pass
5.0791	6	2	33	Pass
5.1288	5	2	40	Pass
5.1786	5	2	40	Pass
5.2283	5	2	40	Pass
5.2780	5	2	40	Pass
5.3277	5	2	40	Pass
5.3775	5	2	40	Pass
5.4272	5	2	40	Pass
5.4769	5	2	40	Pass
5.5267	5	2	40	Pass
5.5764	5	2	40	Pass
5.6261	5	2	40	Pass
5.6758	5	2	40	Pass
5.7256	5	2	40	Pass
5.7753	5	2	40	Pass
5.8250	5	2	40	Pass
5.8747	5	2	40	Pass
5.9245	5	2	40	Pass
5.9742	5	2	40	Pass
6.0239	5	2	40	Pass
6.0737	5	1	20	Pass
6.1234	5	1	20	Pass
6.1731	4	1	25	Pass
6.2228	4	1	25	Pass

Water Quality BMP Flow and Volume for POC #1
On-line facility volume: 0 **acre-feet**
On-line facility target flow: 0 **cfs.**
Adjusted for 15 min: 0 **cfs.**
Off-line facility target flow: 0 **cfs.**
Adjusted for 15 min: 0 **cfs.**

Perlnd and Implnd Changes
No changes have been made.

SDHM2011
PROJECT REPORT

Project Name: QC_POC3-2
Site Name : Quarry Creek
Site Address:
City :
Report Date : 10/5/2012
Gage : OCEANSID
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version : 2012/05/02

Low Flow Threshold for POC 1 : 50 Percent of the 2 Year

High Flow Threshold for POC 1 : 10 year

PREDEVELOPED LAND USE

Name : POC 3-2
Bypass: No

GroundWater: No

Pervious Land Use	Acres
A,Grass,FLAT(0-5%)	1.67
A,Grass,MOD(5-10%)	.55
A,Grass,STEEP(10-20	1
B,Grass,FLAT(0-5%)	.16
B,Grass,MOD(5-10%)	.07
B,Grass,STEEP(10-20	.16
D,Grass,FLAT(0-5%)	1.73
D,Grass,MOD(5-10%)	1.77
D,Grass,STEEP(10-20	4.1
Pervious Total	11.21

Impervious Land Use	Acres
IMPERVIOUS-FLAT	0.59
IMPERVIOUS-MOD	1.12
Impervious Total	1.71
Basin Total	12.92

Element Flows To:
Surface Interflow Groundwater

MITIGATED LAND USE

Name : POC 3-2
Bypass: No

GroundWater: No

Pervious Land Use	Acres
A,Grass,FLAT(0-5%)	.54
A,Grass,STEEP(10-20	.1
B,Grass,FLAT(0-5%)	.06
D,Grass,FLAT(0-5%)	1.36
D,Grass,STEEP(10-20	1.28
Pervious Total	3.34

Impervious Land Use	Acres
IMPERVIOUS-FLAT	9.57
Impervious Total	9.57
Basin Total	12.91

Element Flows To:

Surface	Interflow	Groundwater
Pond 3-2	Pond 3-2	

Name : Pond 3-2
Bottom Length: 488.00 ft.
Bottom Width: 25.00 ft.
Depth : 4 ft.
Volume at riser head : 1.0650 acre-ft.
Side slope 1: 2 To 1
Side slope 2: 2 To 1
Side slope 3: 2 To 1
Side slope 4: 2 To 1
Discharge Structure
Riser Height: 3 ft.
Riser Diameter: 18 in.
Notch Type : Rectangular
Notch Width : 1.498 ft.
Notch Height: 0.200 ft.
Orifice 1 Diameter: 5.5 in. Elevation: 0 ft.

Element Flows To:

Outlet 1	Outlet 2

Pond Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.280	0.000	0.000	0.000
0.0444	0.282	0.012	0.167	0.000
0.0889	0.284	0.025	0.236	0.000
0.1333	0.286	0.037	0.290	0.000
0.1778	0.288	0.050	0.335	0.000
0.2222	0.290	0.063	0.374	0.000
0.2667	0.292	0.076	0.410	0.000
0.3111	0.294	0.089	0.443	0.000
0.3556	0.296	0.102	0.473	0.000
0.4000	0.299	0.115	0.502	0.000
0.4444	0.301	0.129	0.529	0.000
0.4889	0.303	0.142	0.555	0.000
0.5333	0.305	0.156	0.580	0.000
0.5778	0.307	0.169	0.603	0.000
0.6222	0.309	0.183	0.626	0.000
0.6667	0.311	0.197	0.648	0.000
0.7111	0.313	0.211	0.670	0.000
0.7556	0.315	0.225	0.690	0.000
0.8000	0.318	0.239	0.710	0.000
0.8444	0.320	0.253	0.730	0.000
0.8889	0.322	0.267	0.749	0.000
0.9333	0.324	0.282	0.767	0.000
0.9778	0.326	0.296	0.785	0.000
1.0222	0.328	0.311	0.803	0.000
1.0667	0.330	0.325	0.820	0.000
1.1111	0.332	0.340	0.837	0.000
1.1556	0.335	0.355	0.854	0.000
1.2000	0.337	0.370	0.870	0.000
1.2444	0.339	0.385	0.886	0.000
1.2889	0.341	0.400	0.902	0.000
1.3333	0.343	0.415	0.917	0.000
1.3778	0.345	0.430	0.932	0.000
1.4222	0.347	0.446	0.947	0.000
1.4667	0.350	0.461	0.962	0.000
1.5111	0.352	0.477	0.976	0.000
1.5556	0.354	0.493	0.990	0.000
1.6000	0.356	0.508	1.004	0.000
1.6444	0.358	0.524	1.018	0.000
1.6889	0.360	0.540	1.032	0.000
1.7333	0.362	0.556	1.046	0.000
1.7778	0.365	0.573	1.059	0.000
1.8222	0.367	0.589	1.072	0.000
1.8667	0.369	0.605	1.085	0.000
1.9111	0.371	0.622	1.098	0.000
1.9556	0.373	0.638	1.111	0.000
2.0000	0.375	0.655	1.123	0.000
2.0444	0.377	0.672	1.136	0.000
2.0889	0.380	0.688	1.148	0.000
2.1333	0.382	0.705	1.160	0.000
2.1778	0.384	0.722	1.172	0.000
2.2222	0.386	0.740	1.184	0.000
2.2667	0.388	0.757	1.196	0.000
2.3111	0.390	0.774	1.207	0.000
2.3556	0.393	0.792	1.219	0.000

2.4000	0.395	0.809	1.230	0.000
2.4444	0.397	0.827	1.242	0.000
2.4889	0.399	0.844	1.253	0.000
2.5333	0.401	0.862	1.264	0.000
2.5778	0.403	0.880	1.275	0.000
2.6222	0.406	0.898	1.286	0.000
2.6667	0.408	0.916	1.297	0.000
2.7111	0.410	0.934	1.308	0.000
2.7556	0.412	0.953	1.318	0.000
2.8000	0.414	0.971	1.329	0.000
2.8444	0.417	0.990	1.386	0.000
2.8889	0.419	1.008	1.482	0.000
2.9333	0.421	1.027	1.602	0.000
2.9778	0.423	1.046	1.744	0.000
3.0222	0.425	1.065	1.874	0.000
3.0667	0.428	1.083	2.088	0.000
3.1111	0.430	1.103	2.387	0.000
3.1556	0.432	1.122	2.752	0.000
3.2000	0.434	1.141	3.173	0.000
3.2444	0.436	1.160	3.642	0.000
3.2889	0.439	1.180	4.154	0.000
3.3333	0.441	1.199	4.707	0.000
3.3778	0.443	1.219	5.297	0.000
3.4222	0.445	1.239	5.923	0.000
3.4667	0.447	1.259	6.581	0.000
3.5111	0.450	1.279	7.272	0.000
3.5556	0.452	1.299	7.992	0.000
3.6000	0.454	1.319	8.742	0.000
3.6444	0.456	1.339	9.519	0.000
3.6889	0.458	1.359	10.32	0.000
3.7333	0.461	1.380	11.15	0.000
3.7778	0.463	1.400	12.01	0.000
3.8222	0.465	1.421	12.89	0.000
3.8667	0.467	1.442	13.79	0.000
3.9111	0.469	1.463	14.72	0.000
3.9556	0.472	1.484	15.67	0.000
4.0000	0.474	1.505	16.64	0.000
4.0444	0.476	1.526	17.63	0.000

ANALYSIS RESULTS

Predeveloped Landuse Totals for POC #1
Total Pervious Area : 11.83
Total Impervious Area : 1.71

Mitigated Landuse Totals for POC #1
Total Pervious Area : 3.34
Total Impervious Area : 9.57

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	2.554415
5 year	4.754462
10 year	5.940335
25 year	7.593859

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	1.236842
5 year	1.870827
10 year	3.505794
25 year	4.491225

POC #1
The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
1.2772	115	83	72	Pass
1.3243	111	50	45	Pass
1.3714	109	43	39	Pass
1.4185	104	42	40	Pass
1.4656	98	38	38	Pass
1.5127	95	37	38	Pass
1.5598	90	33	36	Pass
1.6069	83	30	36	Pass
1.6540	81	29	35	Pass
1.7011	78	27	34	Pass
1.7482	77	27	35	Pass
1.7953	75	25	33	Pass
1.8424	72	25	34	Pass
1.8895	67	24	35	Pass
1.9366	63	24	38	Pass
1.9837	60	22	36	Pass
2.0308	59	20	33	Pass
2.0779	57	18	31	Pass
2.1250	54	17	31	Pass
2.1722	50	16	32	Pass
2.2193	46	16	34	Pass
2.2664	45	16	35	Pass
2.3135	45	16	35	Pass
2.3606	45	16	35	Pass
2.4077	42	16	38	Pass
2.4548	39	15	38	Pass
2.5019	37	15	40	Pass
2.5490	35	14	40	Pass
2.5961	33	13	39	Pass
2.6432	33	13	39	Pass
2.6903	29	13	44	Pass
2.7374	29	12	41	Pass
2.7845	28	12	42	Pass
2.8316	27	12	44	Pass
2.8787	26	12	46	Pass

2.9258	25	12	48	Pass
2.9729	23	12	52	Pass
3.0200	23	12	52	Pass
3.0671	22	12	54	Pass
3.1142	21	12	57	Pass
3.1613	20	12	60	Pass
3.2084	20	11	55	Pass
3.2555	20	10	50	Pass
3.3026	20	10	50	Pass
3.3497	20	10	50	Pass
3.3968	19	10	52	Pass
3.4439	18	10	55	Pass
3.4910	18	9	50	Pass
3.5381	16	8	50	Pass
3.5852	16	8	50	Pass
3.6323	16	8	50	Pass
3.6794	15	8	53	Pass
3.7265	15	8	53	Pass
3.7736	15	8	53	Pass
3.8207	15	8	53	Pass
3.8678	15	8	53	Pass
3.9149	15	8	53	Pass
3.9620	15	8	53	Pass
4.0091	15	6	40	Pass
4.0562	15	6	40	Pass
4.1033	15	6	40	Pass
4.1504	15	5	33	Pass
4.1975	15	4	26	Pass
4.2447	15	4	26	Pass
4.2918	15	4	26	Pass
4.3389	14	4	28	Pass
4.3860	14	4	28	Pass
4.4331	14	4	28	Pass
4.4802	13	4	30	Pass
4.5273	13	4	30	Pass
4.5744	12	4	33	Pass
4.6215	12	4	33	Pass
4.6686	10	3	30	Pass
4.7157	9	3	33	Pass
4.7628	9	3	33	Pass
4.8099	8	3	37	Pass
4.8570	8	3	37	Pass
4.9041	8	3	37	Pass
4.9512	6	3	50	Pass
4.9983	5	3	60	Pass
5.0454	5	3	60	Pass
5.0925	5	3	60	Pass
5.1396	5	2	40	Pass
5.1867	5	2	40	Pass
5.2338	5	2	40	Pass
5.2809	5	2	40	Pass
5.3280	5	2	40	Pass
5.3751	5	2	40	Pass
5.4222	5	2	40	Pass
5.4693	5	2	40	Pass
5.5164	5	2	40	Pass
5.5635	5	2	40	Pass

5.6106	5	2	40	Pass
5.6577	5	2	40	Pass
5.7048	5	2	40	Pass
5.7519	5	2	40	Pass
5.7990	5	2	40	Pass
5.8461	5	2	40	Pass
5.8932	4	2	50	Pass
5.9403	4	2	50	Pass

Drawdown Time Results

Perlnd and Implnd Changes

No changes have been made.

SDHM2011
PROJECT REPORT

Project Name: QC_POC3-3
Site Name : Quarry Creek
Site Address:
City :
Report Date : 10/5/2012
Gage : OCEANSID
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version : 2012/05/02

Low Flow Threshold for POC 1 : 50 Percent of the 2 Year

High Flow Threshold for POC 1 : 10 year

PREDEVELOPED LAND USE

Name : POC 3-3
Bypass: No

GroundWater: No

Pervious Land Use	Acres
A,Grass,FLAT(0-5%)	.77
A,Grass,MOD(5-10%)	.91
A,Grass,STEEP(10-20	1.72
D,Grass,FLAT(0-5%)	.86
D,Grass,MOD(5-10%)	.32
D,Grass,STEEP(10-20	1.07
Pervious Total	5.65

Impervious Land Use	Acres
IMPERVIOUS-FLAT	0.34
IMPERVIOUS-MOD	0.81
Impervious Total	1.15
Basin Total	6.8

Element Flows To:
Surface Interflow Groundwater

MITIGATED LAND USE

Name : POC 3-3
Bypass: No

GroundWater: No

Pervious Land Use	Acres
A,Grass,FLAT(0-5%)	.7
A,Grass,STEEP(10-20	.66
B,Grass,FLAT(0-5%)	.38
D,Grass,FLAT(0-5%)	.61
D,Grass,STEEP(10-20	.08
Pervious Total	**2.43**

Impervious Land Use	Acres
IMPERVIOUS-FLAT	4.85
Impervious Total	**4.85**
Basin Total	**7.28**

Element Flows To:

Surface	Interflow	Groundwater
Pond 3-3	Pond 3-3	

Name : Pond 3-3
Bottom Length: 475.00 ft.
Bottom Width: 13.00 ft.
Depth : 4 ft.
Volume at riser head : 0.6365 acre-ft.
Side slope 1: 2 To 1
Side slope 2: 2 To 1
Side slope 3: 2 To 1
Side slope 4: 2 To 1
Discharge Structure
Riser Height: 3 ft.
Riser Diameter: 18 in.
Notch Type : Rectangular
Notch Width : 1.200 ft.
Notch Height: 0.084 ft.
Orifice 1 Diameter: 4 in. **Elevation:** 0 ft.

Element Flows To:

Outlet 1	Outlet 2

Pond Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)

0.0000	0.141	0.000	0.000	0.000
0.0444	0.143	0.006	0.088	0.000
0.0889	0.145	0.012	0.125	0.000
0.1333	0.147	0.019	0.153	0.000
0.1778	0.149	0.025	0.177	0.000
0.2222	0.151	0.032	0.198	0.000
0.2667	0.153	0.039	0.217	0.000
0.3111	0.155	0.046	0.234	0.000
0.3556	0.157	0.053	0.250	0.000
0.4000	0.159	0.060	0.265	0.000
0.4444	0.161	0.067	0.280	0.000
0.4889	0.163	0.074	0.293	0.000
0.5333	0.165	0.082	0.306	0.000
0.5778	0.167	0.089	0.319	0.000
0.6222	0.169	0.096	0.331	0.000
0.6667	0.171	0.104	0.343	0.000
0.7111	0.173	0.112	0.354	0.000
0.7556	0.175	0.120	0.365	0.000
0.8000	0.177	0.127	0.375	0.000
0.8444	0.179	0.135	0.386	0.000
0.8889	0.181	0.143	0.396	0.000
0.9333	0.183	0.151	0.406	0.000
0.9778	0.185	0.160	0.415	0.000
1.0222	0.187	0.168	0.424	0.000
1.0667	0.190	0.176	0.434	0.000
1.1111	0.192	0.185	0.443	0.000
1.1556	0.194	0.193	0.451	0.000
1.2000	0.196	0.202	0.460	0.000
1.2444	0.198	0.211	0.468	0.000
1.2889	0.200	0.220	0.477	0.000
1.3333	0.202	0.229	0.485	0.000
1.3778	0.204	0.238	0.493	0.000
1.4222	0.206	0.247	0.501	0.000
1.4667	0.208	0.256	0.508	0.000
1.5111	0.210	0.265	0.516	0.000
1.5556	0.212	0.275	0.524	0.000
1.6000	0.214	0.284	0.531	0.000
1.6444	0.216	0.294	0.538	0.000
1.6889	0.218	0.303	0.546	0.000
1.7333	0.220	0.313	0.553	0.000
1.7778	0.222	0.323	0.560	0.000
1.8222	0.224	0.333	0.567	0.000
1.8667	0.226	0.343	0.574	0.000
1.9111	0.228	0.353	0.580	0.000
1.9556	0.230	0.363	0.587	0.000
2.0000	0.232	0.374	0.594	0.000
2.0444	0.234	0.384	0.600	0.000
2.0889	0.237	0.395	0.607	0.000
2.1333	0.239	0.405	0.613	0.000
2.1778	0.241	0.416	0.620	0.000
2.2222	0.243	0.427	0.626	0.000
2.2667	0.245	0.437	0.632	0.000
2.3111	0.247	0.448	0.638	0.000
2.3556	0.249	0.459	0.644	0.000
2.4000	0.251	0.471	0.651	0.000
2.4444	0.253	0.482	0.657	0.000
2.4889	0.255	0.493	0.663	0.000

2.5333	0.257	0.504	0.668	0.000
2.5778	0.259	0.516	0.674	0.000
2.6222	0.261	0.528	0.680	0.000
2.6667	0.263	0.539	0.686	0.000
2.7111	0.265	0.551	0.691	0.000
2.7556	0.268	0.563	0.697	0.000
2.8000	0.270	0.575	0.703	0.000
2.8444	0.272	0.587	0.708	0.000
2.8889	0.274	0.599	0.714	0.000
2.9333	0.276	0.611	0.728	0.000
2.9778	0.278	0.624	0.786	0.000
3.0222	0.280	0.636	0.876	0.000
3.0667	0.282	0.649	1.084	0.000
3.1111	0.284	0.661	1.379	0.000
3.1556	0.286	0.674	1.740	0.000
3.2000	0.288	0.687	2.155	0.000
3.2444	0.291	0.700	2.619	0.000
3.2889	0.293	0.712	3.127	0.000
3.3333	0.295	0.726	3.675	0.000
3.3778	0.297	0.739	4.261	0.000
3.4222	0.299	0.752	4.882	0.000
3.4667	0.301	0.765	5.536	0.000
3.5111	0.303	0.779	6.222	0.000
3.5556	0.305	0.792	6.938	0.000
3.6000	0.307	0.806	7.684	0.000
3.6444	0.310	0.820	8.457	0.000
3.6889	0.312	0.834	9.257	0.000
3.7333	0.314	0.847	10.08	0.000
3.7778	0.316	0.861	10.93	0.000
3.8222	0.318	0.876	11.81	0.000
3.8667	0.320	0.890	12.71	0.000
3.9111	0.322	0.904	13.63	0.000
3.9556	0.324	0.918	14.57	0.000
4.0000	0.326	0.933	15.54	0.000
4.0444	0.329	0.947	16.53	0.000

ANALYSIS RESULTS

Predeveloped Landuse Totals for POC #1
Total Pervious Area : 6.56
Total Impervious Area : 1.15

Mitigated Landuse Totals for POC #1
Total Pervious Area : 2.43
Total Impervious Area : 4.85

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	1.308187
5 year	2.348898

10 year	3.059072
25 year	3.904055

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.617947
5 year	0.695295
10 year	1.254452
25 year	1.840666

POC #1
The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.6541	117	74	63	Pass
0.6784	106	47	44	Pass
0.7027	102	31	30	Pass
0.7270	98	26	26	Pass
0.7513	94	24	25	Pass
0.7756	90	22	24	Pass
0.7998	84	20	23	Pass
0.8241	84	19	22	Pass
0.8484	81	18	22	Pass
0.8727	79	17	21	Pass
0.8970	77	17	22	Pass
0.9213	72	17	23	Pass
0.9456	67	16	23	Pass
0.9699	65	15	23	Pass
0.9942	62	14	22	Pass
1.0185	61	12	19	Pass
1.0428	60	12	20	Pass
1.0671	52	12	23	Pass
1.0914	49	11	22	Pass
1.1157	47	11	23	Pass
1.1399	46	11	23	Pass
1.1642	46	9	19	Pass
1.1885	45	9	20	Pass
1.2128	42	9	21	Pass
1.2371	39	9	23	Pass
1.2614	36	8	22	Pass
1.2857	36	8	22	Pass
1.3100	34	8	23	Pass
1.3343	32	8	25	Pass
1.3586	30	8	26	Pass
1.3829	28	8	28	Pass
1.4072	28	8	28	Pass
1.4315	28	8	28	Pass
1.4558	25	8	32	Pass
1.4800	23	8	34	Pass
1.5043	23	7	30	Pass
1.5286	22	7	31	Pass
1.5529	21	7	33	Pass

1.5772	21	7	33	Pass
1.6015	21	6	28	Pass
1.6258	21	6	28	Pass
1.6501	20	6	30	Pass
1.6744	20	5	25	Pass
1.6987	19	5	26	Pass
1.7230	18	5	27	Pass
1.7473	18	5	27	Pass
1.7716	16	5	31	Pass
1.7959	16	5	31	Pass
1.8201	16	5	31	Pass
1.8444	16	5	31	Pass
1.8687	15	5	33	Pass
1.8930	15	5	33	Pass
1.9173	15	3	20	Pass
1.9416	15	3	20	Pass
1.9659	15	3	20	Pass
1.9902	15	3	20	Pass
2.0145	15	3	20	Pass
2.0388	15	3	20	Pass
2.0631	15	3	20	Pass
2.0874	15	3	20	Pass
2.1117	14	2	14	Pass
2.1359	13	2	15	Pass
2.1602	13	2	15	Pass
2.1845	11	2	18	Pass
2.2088	10	2	20	Pass
2.2331	10	2	20	Pass
2.2574	10	2	20	Pass
2.2817	10	2	20	Pass
2.3060	10	2	20	Pass
2.3303	10	2	20	Pass
2.3546	9	2	22	Pass
2.3789	8	2	25	Pass
2.4032	8	2	25	Pass
2.4275	7	2	28	Pass
2.4518	7	2	28	Pass
2.4760	7	2	28	Pass
2.5003	6	2	33	Pass
2.5246	6	2	33	Pass
2.5489	5	2	40	Pass
2.5732	5	2	40	Pass
2.5975	5	2	40	Pass
2.6218	5	2	40	Pass
2.6461	5	2	40	Pass
2.6704	5	2	40	Pass
2.6947	5	2	40	Pass
2.7190	5	2	40	Pass
2.7433	5	2	40	Pass
2.7676	5	2	40	Pass
2.7919	5	2	40	Pass
2.8161	5	2	40	Pass
2.8404	5	2	40	Pass
2.8647	5	2	40	Pass
2.8890	5	2	40	Pass
2.9133	5	2	40	Pass
2.9376	5	2	40	Pass

2.9619	5	2	40	Pass
2.9862	5	2	40	Pass
3.0105	5	2	40	Pass
3.0348	4	2	50	Pass
3.0591	4	2	50	Pass

Drawdown Time Results

Perlnd and Implnd Changes

No changes have been made.

SDHM2011
PROJECT REPORT

Project Name: QC_POC3-7
Site Name : Quarry Creek
Site Address:
City :
Report Date : 3/5/2012
Gage : OCEANSID
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version : 2012/03/01

PREDEVELOPED LAND USE

Name : POC 3-7
Bypass: No

GroundWater: No

Pervious Land Use	Acres
A,Grass,FLAT(0-5%)	1.14
A,Grass,MOD(5-10%)	.01
A,Grass,STEEP(10-20	.41
D,Grass,STEEP(10-20	.02

Impervious Land Use	Acres
IMPERVIOUS-FLAT	0.26
IMPERVIOUS-MOD	0.16

Element Flows To:
Surface Interflow Groundwater

MITIGATED LAND USE

Name : POC 3-7
Bypass: No

GroundWater: No

Pervious Land Use	Acres
A,Grass,FLAT(0-5%)	.73
A,Grass,STEEP(10-20	.52
D,Grass,STEEP(10-20	.03

Impervious Land Use	Acres
IMPERVIOUS-FLAT	0.73

Element Flows To:

Surface	Interflow	Groundwater
Pond 3-7	Pond 3-7	

Name : Pond 3-7
Bottom Length: 28.00 ft.
Bottom Width: 28.00 ft.
Depth : 4 ft.
Volume at riser head : 0.0813 acre-ft.
Side slope 1: 2 To 1
Side slope 2: 2 To 1
Side slope 3: 2 To 1
Side slope 4: 2 To 1
Discharge Structure
Riser Height: 3 ft.
Riser Diameter: 18 in.
Notch Type : Rectangular
Notch Width : 0.260 ft.
Notch Height: 0.891 ft.
Orifice 1 Diameter: 2.013 in. **Elevation:** 0 ft.

Element Flows To:

Outlet 1	Outlet 2

Pond Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.018	0.000	0.000	0.000
0.0444	0.018	0.000	0.022	0.000
0.0889	0.018	0.001	0.031	0.000
0.1333	0.018	0.002	0.038	0.000
0.1778	0.018	0.003	0.044	0.000
0.2222	0.019	0.004	0.050	0.000
0.2667	0.019	0.005	0.055	0.000
0.3111	0.019	0.005	0.059	0.000
0.3556	0.019	0.006	0.063	0.000
0.4000	0.020	0.007	0.067	0.000
0.4444	0.020	0.008	0.071	0.000
0.4889	0.020	0.009	0.074	0.000
0.5333	0.020	0.010	0.077	0.000
0.5778	0.021	0.011	0.080	0.000
0.6222	0.021	0.012	0.083	0.000
0.6667	0.021	0.013	0.086	0.000
0.7111	0.021	0.014	0.089	0.000
0.7556	0.022	0.015	0.092	0.000
0.8000	0.022	0.016	0.095	0.000
0.8444	0.022	0.017	0.097	0.000
0.8889	0.022	0.018	0.100	0.000
0.9333	0.023	0.019	0.102	0.000

0.9778	0.023	0.020	0.105	0.000
1.0222	0.023	0.021	0.107	0.000
1.0667	0.023	0.022	0.109	0.000
1.1111	0.024	0.023	0.112	0.000
1.1556	0.024	0.024	0.114	0.000
1.2000	0.024	0.025	0.116	0.000
1.2444	0.025	0.026	0.118	0.000
1.2889	0.025	0.027	0.120	0.000
1.3333	0.025	0.028	0.122	0.000
1.3778	0.025	0.030	0.124	0.000
1.4222	0.026	0.031	0.126	0.000
1.4667	0.026	0.032	0.128	0.000
1.5111	0.026	0.033	0.130	0.000
1.5556	0.026	0.034	0.132	0.000
1.6000	0.027	0.035	0.134	0.000
1.6444	0.027	0.037	0.136	0.000
1.6889	0.027	0.038	0.138	0.000
1.7333	0.028	0.039	0.140	0.000
1.7778	0.028	0.040	0.141	0.000
1.8222	0.028	0.042	0.143	0.000
1.8667	0.028	0.043	0.145	0.000
1.9111	0.029	0.044	0.147	0.000
1.9556	0.029	0.045	0.148	0.000
2.0000	0.029	0.047	0.150	0.000
2.0444	0.030	0.048	0.152	0.000
2.0889	0.030	0.049	0.153	0.000
2.1333	0.030	0.051	0.158	0.000
2.1778	0.030	0.052	0.172	0.000
2.2222	0.031	0.054	0.190	0.000
2.2667	0.031	0.055	0.212	0.000
2.3111	0.031	0.056	0.237	0.000
2.3556	0.032	0.058	0.264	0.000
2.4000	0.032	0.059	0.292	0.000
2.4444	0.032	0.061	0.323	0.000
2.4889	0.033	0.062	0.355	0.000
2.5333	0.033	0.064	0.388	0.000
2.5778	0.033	0.065	0.422	0.000
2.6222	0.034	0.067	0.458	0.000
2.6667	0.034	0.068	0.494	0.000
2.7111	0.034	0.070	0.531	0.000
2.7556	0.035	0.071	0.568	0.000
2.8000	0.035	0.073	0.606	0.000
2.8444	0.035	0.074	0.645	0.000
2.8889	0.035	0.076	0.684	0.000
2.9333	0.036	0.078	0.723	0.000
2.9778	0.036	0.079	0.762	0.000
3.0222	0.036	0.081	0.831	0.000
3.0667	0.037	0.082	1.036	0.000
3.1111	0.037	0.084	1.327	0.000
3.1556	0.037	0.086	1.683	0.000
3.2000	0.038	0.087	2.095	0.000
3.2444	0.038	0.089	2.555	0.000
3.2889	0.038	0.091	3.059	0.000
3.3333	0.039	0.093	3.604	0.000
3.3778	0.039	0.094	4.186	0.000
3.4222	0.039	0.096	4.803	0.000
3.4667	0.040	0.098	5.453	0.000

3.5111	0.040	0.100	6.135	0.000
3.5556	0.040	0.102	6.848	0.000
3.6000	0.041	0.103	7.589	0.000
3.6444	0.041	0.105	8.359	0.000
3.6889	0.042	0.107	9.155	0.000
3.7333	0.042	0.109	9.978	0.000
3.7778	0.042	0.111	10.82	0.000
3.8222	0.043	0.113	11.69	0.000
3.8667	0.043	0.115	12.59	0.000
3.9111	0.043	0.117	13.51	0.000
3.9556	0.044	0.119	14.45	0.000
4.0000	0.044	0.121	15.42	0.000
4.0444	0.044	0.123	16.40	0.000

ANALYSIS RESULTS

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.309411
5 year	0.570519
10 year	0.807954
25 year	1.041506

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.152638
5 year	0.396699
10 year	0.526462
25 year	0.70775

POC #1
The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1547	157	65	41	Pass
0.1613	139	61	43	Pass
0.1679	117	53	45	Pass
0.1745	109	48	44	Pass
0.1811	105	48	45	Pass
0.1877	99	42	42	Pass
0.1943	98	38	38	Pass
0.2009	95	37	38	Pass
0.2075	84	36	42	Pass
0.2141	76	36	47	Pass
0.2207	72	32	44	Pass
0.2273	67	31	46	Pass
0.2339	63	31	49	Pass
0.2405	60	31	51	Pass
0.2471	55	30	54	Pass

0.2537	52	30	57	Pass
0.2603	48	30	62	Pass
0.2669	45	29	64	Pass
0.2735	45	28	62	Pass
0.2801	45	28	62	Pass
0.2867	43	25	58	Pass
0.2933	40	24	60	Pass
0.2999	37	24	64	Pass
0.3065	35	23	65	Pass
0.3131	32	22	68	Pass
0.3197	31	22	70	Pass
0.3263	29	22	75	Pass
0.3329	29	22	75	Pass
0.3395	28	21	75	Pass
0.3461	27	21	77	Pass
0.3527	25	21	84	Pass
0.3593	25	20	80	Pass
0.3659	24	20	83	Pass
0.3725	24	20	83	Pass
0.3791	24	20	83	Pass
0.3857	24	19	79	Pass
0.3923	22	17	77	Pass
0.3988	20	17	85	Pass
0.4054	18	17	94	Pass
0.4120	18	15	83	Pass
0.4186	18	14	77	Pass
0.4252	17	14	82	Pass
0.4318	16	13	81	Pass
0.4384	15	10	66	Pass
0.4450	15	10	66	Pass
0.4516	15	8	53	Pass
0.4582	14	8	57	Pass
0.4648	14	8	57	Pass
0.4714	13	8	61	Pass
0.4780	12	8	66	Pass
0.4846	12	8	66	Pass
0.4912	12	8	66	Pass
0.4978	12	7	58	Pass
0.5044	12	7	58	Pass
0.5110	12	7	58	Pass
0.5176	12	7	58	Pass
0.5242	11	6	54	Pass
0.5308	10	6	60	Pass
0.5374	10	6	60	Pass
0.5440	10	6	60	Pass
0.5506	10	6	60	Pass
0.5572	10	6	60	Pass
0.5638	9	6	66	Pass
0.5704	9	6	66	Pass
0.5770	9	6	66	Pass
0.5836	8	6	75	Pass
0.5902	8	6	75	Pass
0.5968	8	6	75	Pass
0.6034	7	5	71	Pass
0.6100	6	5	83	Pass
0.6166	6	5	83	Pass
0.6232	6	5	83	Pass

0.6298	6	5	83	Pass
0.6364	6	5	83	Pass
0.6430	6	5	83	Pass
0.6496	6	5	83	Pass
0.6562	5	5	100	Pass
0.6628	5	5	100	Pass
0.6694	5	5	100	Pass
0.6760	5	5	100	Pass
0.6826	5	5	100	Pass
0.6892	5	5	100	Pass
0.6958	5	4	80	Pass
0.7024	5	4	80	Pass
0.7090	5	4	80	Pass
0.7156	5	2	40	Pass
0.7222	5	2	40	Pass
0.7288	5	2	40	Pass
0.7354	5	2	40	Pass
0.7420	5	2	40	Pass
0.7486	5	2	40	Pass
0.7552	5	2	40	Pass
0.7618	5	2	40	Pass
0.7684	5	2	40	Pass
0.7750	5	2	40	Pass
0.7816	5	2	40	Pass
0.7882	5	2	40	Pass
0.7948	5	2	40	Pass
0.8014	4	2	50	Pass
0.8080	4	2	50	Pass

Water Quality BMP Flow and Volume for POC #1
On-line facility volume: 0 **acre-feet**
On-line facility target flow: 0 **cfs.**
Adjusted for 15 min: 0 **cfs.**
Off-line facility target flow: 0 **cfs.**
Adjusted for 15 min: 0 **cfs.**

Perlnd and Implnd Changes
No changes have been made.

SDHM2011
PROJECT REPORT

Project Name: QC_POC4
Site Name : Quarry Creek
Site Address:
City :
Report Date : 3/5/2012
Gage : OCEANSID
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version : 2012/03/01

PREDEVELOPED LAND USE

Name : POC 4
Bypass: No

GroundWater: No

Pervious Land Use	Acres
A,Grass,FLAT(0-5%)	.52
A,Grass,MOD(5-10%)	.01
B,Grass,FLAT(0-5%)	3.02
B,Grass,MOD(5-10%)	.93
B,Grass,STEEP(10-20	1.06
D,Grass,FLAT(0-5%)	4.63
D,Grass,MOD(5-10%)	1.39
D,Grass,STEEP(10-20	12.72

Impervious Land Use	Acres
IMPERVIOUS-FLAT	1.62
IMPERVIOUS-MOD	0.48

Element Flows To:

Surface	Interflow	Groundwater

MITIGATED LAND USE

Name : POC 4
Bypass: No

GroundWater: No

Pervious Land Use	Acres
A,Grass,FLAT(0-5%)	.07
B,Grass,FLAT(0-5%)	.9
D,Grass,FLAT(0-5%)	4.22

D,Grass,STEEP(10-20	2.05

Impervious Land Use	Acres
IMPERVIOUS-FLAT	19.33

Element Flows To:

Surface	Interflow	Groundwater
Pond 4	Pond 4	

Name : Pond 4
Bottom Length: 540.00 ft.
Bottom Width: 40.00 ft.
Depth : 5 ft.
Volume at riser head : 2.4572 acre-ft.
Side slope 1: 2 To 1
Side slope 2: 2 To 1
Side slope 3: 2 To 1
Side slope 4: 2 To 1

Discharge Structure

Riser Height: 4 ft.
Riser Diameter: 18 in.
Notch Type : Rectangular
Notch Width : 1.500 ft.
Notch Height: 0.822 ft.
Orifice 1 Diameter: 7.491 in. **Elevation:** 0 ft.

Element Flows To:

Outlet 1	Outlet 2

Pond Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.495	0.000	0.000	0.000
0.0556	0.498	0.027	0.347	0.000
0.1111	0.501	0.055	0.491	0.000
0.1667	0.504	0.083	0.601	0.000
0.2222	0.507	0.111	0.694	0.000
0.2778	0.510	0.139	0.776	0.000
0.3333	0.513	0.168	0.850	0.000
0.3889	0.516	0.196	0.919	0.000
0.4444	0.519	0.225	0.982	0.000
0.5000	0.522	0.254	1.042	0.000
0.5556	0.525	0.283	1.098	0.000
0.6111	0.528	0.313	1.152	0.000
0.6667	0.531	0.342	1.203	0.000
0.7222	0.534	0.372	1.252	0.000
0.7778	0.537	0.401	1.299	0.000
0.8333	0.540	0.431	1.345	0.000
0.8889	0.543	0.461	1.389	0.000

0.9444	0.546	0.492	1.432	0.000
1.0000	0.549	0.522	1.473	0.000
1.0556	0.552	0.553	1.514	0.000
1.1111	0.555	0.584	1.553	0.000
1.1667	0.558	0.615	1.591	0.000
1.2222	0.561	0.646	1.629	0.000
1.2778	0.564	0.677	1.666	0.000
1.3333	0.567	0.708	1.701	0.000
1.3889	0.570	0.740	1.736	0.000
1.4444	0.573	0.772	1.771	0.000
1.5000	0.576	0.804	1.805	0.000
1.5556	0.579	0.836	1.838	0.000
1.6111	0.582	0.868	1.870	0.000
1.6667	0.585	0.901	1.902	0.000
1.7222	0.588	0.933	1.934	0.000
1.7778	0.591	0.966	1.965	0.000
1.8333	0.594	0.999	1.995	0.000
1.8889	0.597	1.032	2.025	0.000
1.9444	0.600	1.065	2.055	0.000
2.0000	0.603	1.099	2.084	0.000
2.0556	0.606	1.132	2.113	0.000
2.1111	0.609	1.166	2.141	0.000
2.1667	0.613	1.200	2.169	0.000
2.2222	0.616	1.234	2.197	0.000
2.2778	0.619	1.269	2.224	0.000
2.3333	0.622	1.303	2.251	0.000
2.3889	0.625	1.338	2.277	0.000
2.4444	0.628	1.373	2.304	0.000
2.5000	0.631	1.408	2.330	0.000
2.5556	0.634	1.443	2.356	0.000
2.6111	0.637	1.478	2.381	0.000
2.6667	0.640	1.514	2.406	0.000
2.7222	0.643	1.549	2.431	0.000
2.7778	0.646	1.585	2.456	0.000
2.8333	0.649	1.621	2.480	0.000
2.8889	0.652	1.657	2.505	0.000
2.9444	0.655	1.694	2.529	0.000
3.0000	0.659	1.730	2.552	0.000
3.0556	0.662	1.767	2.576	0.000
3.1111	0.665	1.804	2.599	0.000
3.1667	0.668	1.841	2.622	0.000
3.2222	0.671	1.878	2.692	0.000
3.2778	0.674	1.915	2.826	0.000
3.3333	0.677	1.953	2.997	0.000
3.3889	0.680	1.991	3.198	0.000
3.4444	0.683	2.028	3.423	0.000
3.5000	0.686	2.067	3.671	0.000
3.5556	0.689	2.105	3.939	0.000
3.6111	0.693	2.143	4.226	0.000
3.6667	0.696	2.182	4.530	0.000
3.7222	0.699	2.221	4.851	0.000
3.7778	0.702	2.259	5.187	0.000
3.8333	0.705	2.299	5.538	0.000
3.8889	0.708	2.338	5.903	0.000
3.9444	0.711	2.377	6.281	0.000
4.0000	0.714	2.417	6.673	0.000
4.0556	0.717	2.457	6.884	0.000

4.1111	0.721	2.497	7.254	0.000
4.1667	0.724	2.537	7.727	0.000
4.2222	0.727	2.577	8.284	0.000
4.2778	0.730	2.618	8.912	0.000
4.3333	0.733	2.658	9.604	0.000
4.3889	0.736	2.699	10.35	0.000
4.4444	0.739	2.740	11.16	0.000
4.5000	0.743	2.781	12.01	0.000
4.5556	0.746	2.823	12.92	0.000
4.6111	0.749	2.864	13.86	0.000
4.6667	0.752	2.906	14.86	0.000
4.7222	0.755	2.948	15.89	0.000
4.7778	0.758	2.990	16.96	0.000
4.8333	0.761	3.032	18.07	0.000
4.8889	0.765	3.075	19.22	0.000
4.9444	0.768	3.117	20.41	0.000
5.0000	0.771	3.160	21.62	0.000
5.0556	0.774	3.203	22.88	0.000

ANALYSIS RESULTS

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	5.253411
5 year	10.072032
10 year	12.299347
25 year	15.765648

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	2.497558
5 year	3.968278
10 year	6.568882
25 year	7.801823

POC #1
The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
2.6267	109	81	74	Pass
2.7244	105	65	61	Pass
2.8221	102	54	52	Pass
2.9198	95	49	51	Pass
3.0175	92	46	50	Pass
3.1152	87	42	48	Pass
3.2129	81	37	45	Pass
3.3106	78	35	44	Pass
3.4083	74	34	45	Pass
3.5060	73	33	45	Pass

3.6037	73	32	43	Pass
3.7014	72	30	41	Pass
3.7991	68	30	44	Pass
3.8969	67	27	40	Pass
3.9946	63	26	41	Pass
4.0923	60	25	41	Pass
4.1900	58	23	39	Pass
4.2877	57	21	36	Pass
4.3854	55	19	34	Pass
4.4831	53	18	33	Pass
4.5808	48	17	35	Pass
4.6785	46	17	36	Pass
4.7762	44	17	38	Pass
4.8739	44	17	38	Pass
4.9716	44	17	38	Pass
5.0693	41	16	39	Pass
5.1670	39	14	35	Pass
5.2647	35	13	37	Pass
5.3624	33	12	36	Pass
5.4601	31	11	35	Pass
5.5578	30	10	33	Pass
5.6555	27	10	37	Pass
5.7532	27	10	37	Pass
5.8509	27	10	37	Pass
5.9486	27	10	37	Pass
6.0463	25	10	40	Pass
6.1440	24	10	41	Pass
6.2417	23	10	43	Pass
6.3394	23	9	39	Pass
6.4371	22	9	40	Pass
6.5348	22	7	31	Pass
6.6325	21	7	33	Pass
6.7303	21	7	33	Pass
6.8280	21	7	33	Pass
6.9257	20	7	35	Pass
7.0234	20	7	35	Pass
7.1211	20	7	35	Pass
7.2188	19	7	36	Pass
7.3165	18	7	38	Pass
7.4142	17	7	41	Pass
7.5119	16	7	43	Pass
7.6096	16	7	43	Pass
7.7073	15	4	26	Pass
7.8050	15	4	26	Pass
7.9027	15	3	20	Pass
8.0004	15	3	20	Pass
8.0981	15	3	20	Pass
8.1958	15	3	20	Pass
8.2935	15	2	13	Pass
8.3912	15	2	13	Pass
8.4889	15	2	13	Pass
8.5866	15	2	13	Pass
8.6843	15	2	13	Pass
8.7820	15	2	13	Pass
8.8797	15	2	13	Pass
8.9774	15	2	13	Pass
9.0751	14	2	14	Pass

9.1728	14	2	14	Pass
9.2705	14	2	14	Pass
9.3682	14	2	14	Pass
9.4659	14	2	14	Pass
9.5637	14	2	14	Pass
9.6614	12	2	16	Pass
9.7591	11	2	18	Pass
9.8568	9	2	22	Pass
9.9545	9	2	22	Pass
10.0522	9	2	22	Pass
10.1499	9	2	22	Pass
10.2476	9	2	22	Pass
10.3453	7	2	28	Pass
10.4430	6	2	33	Pass
10.5407	6	2	33	Pass
10.6384	6	2	33	Pass
10.7361	5	2	40	Pass
10.8338	5	2	40	Pass
10.9315	5	2	40	Pass
11.0292	5	2	40	Pass
11.1269	5	2	40	Pass
11.2246	5	2	40	Pass
11.3223	5	2	40	Pass
11.4200	5	2	40	Pass
11.5177	5	2	40	Pass
11.6154	5	2	40	Pass
11.7131	5	2	40	Pass
11.8108	5	2	40	Pass
11.9085	5	2	40	Pass
12.0062	5	2	40	Pass
12.1039	5	2	40	Pass
12.2016	4	2	50	Pass
12.2993	4	2	50	Pass

Water Quality BMP Flow and Volume for POC #1
On-line facility volume: 0 **acre-feet**
On-line facility target flow: 0 **cfs.**
Adjusted for 15 min: 0 **cfs.**
Off-line facility target flow: 0 **cfs.**
Adjusted for 15 min: 0 **cfs.**

Perlnd and Implnd Changes
No changes have been made.

SDHM2011
PROJECT REPORT

Project Name: QC_POC5
Site Name : Quarry Creek
Site Address:
City :
Report Date : 10/5/2012
Gage : OCEANSID
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version : 2012/05/02

Low Flow Threshold for POC 1 : 50 Percent of the 2 Year

High Flow Threshold for POC 1 : 10 year

PREDEVELOPED LAND USE

Name : POC 5
Bypass: No

GroundWater: No

Pervious Land Use	Acres
D,Grass,FLAT(0-5%)	.5
D,Grass,MOD(5-10%)	1.05
D,Grass,STEEP(10-20	6.11
Pervious Total	7.66

Impervious Land Use	Acres
Impervious Total	0
Basin Total	7.66

Element Flows To:

Surface	Interflow	Groundwater

MITIGATED LAND USE

Name : POC 5
Bypass: No

GroundWater: No

Pervious Land Use	Acres
D,Grass,FLAT(0-5%)	1.18
Pervious Total	1.18

Impervious Land Use	Acres
IMPERVIOUS-FLAT	4.73
Impervious Total	4.73

Basin Total	5.91

Element Flows To:

Surface	Interflow	Groundwater
Pond 5	Pond 5	

Name : Pond 5
Bottom Length: 380.00 ft.
Bottom Width: 30.00 ft.
Depth : 2.5 ft.
Volume at riser head : 0.4353 acre-ft.
Side slope 1: 2 To 1
Side slope 2: 2 To 1
Side slope 3: 2 To 1
Side slope 4: 2 To 1
Discharge Structure
Riser Height: 1.5 ft.
Riser Diameter: 18 in.
Notch Type : Rectangular
Notch Width : 1.500 ft.
Notch Height: 0.075 ft.
Orifice 1 Diameter: 5 in. **Elevation:** 0 ft.

Element Flows To:

Outlet 1	Outlet 2

Pond Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.261	0.000	0.000	0.000
0.0278	0.262	0.007	0.109	0.000
0.0556	0.263	0.014	0.154	0.000
0.0833	0.264	0.021	0.189	0.000
0.1111	0.265	0.029	0.218	0.000
0.1389	0.266	0.036	0.244	0.000
0.1667	0.268	0.044	0.268	0.000
0.1944	0.269	0.051	0.289	0.000
0.2222	0.270	0.059	0.309	0.000

0.2500	0.271	0.066	0.328	0.000
0.2778	0.272	0.074	0.346	0.000
0.3056	0.273	0.081	0.362	0.000
0.3333	0.274	0.089	0.379	0.000
0.3611	0.275	0.097	0.394	0.000
0.3889	0.276	0.104	0.409	0.000
0.4167	0.277	0.112	0.423	0.000
0.4444	0.278	0.120	0.437	0.000
0.4722	0.279	0.127	0.451	0.000
0.5000	0.280	0.135	0.464	0.000
0.5278	0.281	0.143	0.477	0.000
0.5556	0.282	0.151	0.489	0.000
0.5833	0.283	0.159	0.501	0.000
0.6111	0.284	0.167	0.513	0.000
0.6389	0.285	0.174	0.524	0.000
0.6667	0.287	0.182	0.536	0.000
0.6944	0.288	0.190	0.547	0.000
0.7222	0.289	0.198	0.558	0.000
0.7500	0.290	0.206	0.568	0.000
0.7778	0.291	0.215	0.579	0.000
0.8056	0.292	0.223	0.589	0.000
0.8333	0.293	0.231	0.599	0.000
0.8611	0.294	0.239	0.609	0.000
0.8889	0.295	0.247	0.619	0.000
0.9167	0.296	0.255	0.628	0.000
0.9444	0.297	0.264	0.638	0.000
0.9722	0.298	0.272	0.647	0.000
1.0000	0.299	0.280	0.656	0.000
1.0278	0.300	0.289	0.665	0.000
1.0556	0.301	0.297	0.674	0.000
1.0833	0.302	0.305	0.683	0.000
1.1111	0.304	0.314	0.692	0.000
1.1389	0.305	0.322	0.700	0.000
1.1667	0.306	0.331	0.709	0.000
1.1944	0.307	0.339	0.717	0.000
1.2222	0.308	0.348	0.725	0.000
1.2500	0.309	0.356	0.734	0.000
1.2778	0.310	0.365	0.742	0.000
1.3056	0.311	0.374	0.750	0.000
1.3333	0.312	0.382	0.758	0.000
1.3611	0.313	0.391	0.766	0.000
1.3889	0.314	0.400	0.773	0.000
1.4167	0.315	0.408	0.781	0.000
1.4444	0.316	0.417	0.803	0.000
1.4722	0.317	0.426	0.848	0.000
1.5000	0.319	0.435	0.907	0.000
1.5278	0.320	0.444	0.982	0.000
1.5556	0.321	0.453	1.113	0.000
1.5833	0.322	0.462	1.280	0.000
1.6111	0.323	0.471	1.477	0.000
1.6389	0.324	0.480	1.699	0.000
1.6667	0.325	0.489	1.944	0.000
1.6944	0.326	0.498	2.210	0.000
1.7222	0.327	0.507	2.495	0.000
1.7500	0.328	0.516	2.797	0.000
1.7778	0.329	0.525	3.117	0.000
1.8056	0.330	0.534	3.452	0.000

1.8333	0.332	0.543	3.803	0.000
1.8611	0.333	0.553	4.168	0.000
1.8889	0.334	0.562	4.548	0.000
1.9167	0.335	0.571	4.941	0.000
1.9444	0.336	0.581	5.347	0.000
1.9722	0.337	0.590	5.765	0.000
2.0000	0.338	0.599	6.196	0.000
2.0278	0.339	0.609	6.639	0.000
2.0556	0.340	0.618	7.093	0.000
2.0833	0.341	0.628	7.559	0.000
2.1111	0.342	0.637	8.036	0.000
2.1389	0.343	0.647	8.523	0.000
2.1667	0.345	0.656	9.021	0.000
2.1944	0.346	0.666	9.529	0.000
2.2222	0.347	0.675	10.04	0.000
2.2500	0.348	0.685	10.57	0.000
2.2778	0.349	0.695	11.11	0.000
2.3056	0.350	0.704	11.66	0.000
2.3333	0.351	0.714	12.21	0.000
2.3611	0.352	0.724	12.78	0.000
2.3889	0.353	0.734	13.36	0.000
2.4167	0.354	0.744	13.94	0.000
2.4444	0.355	0.754	14.53	0.000
2.4722	0.357	0.763	15.14	0.000
2.5000	0.358	0.773	15.75	0.000
2.5278	0.359	0.783	16.36	0.000

ANALYSIS RESULTS

Predeveloped Landuse Totals for POC #1
Total Pervious Area : 7.66
Total Impervious Area : 0

Mitigated Landuse Totals for POC #1
Total Pervious Area : 1.18
Total Impervious Area : 4.73

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	1.610684
5 year	3.23441
10 year	3.912057
25 year	4.756083

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.719743
5 year	1.178043
10 year	2.220707
25 year	2.486757

POC #1
The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.8053	117	41	35	Pass
0.8367	109	35	32	Pass
0.8681	106	31	29	Pass
0.8995	102	31	30	Pass
0.9309	98	30	30	Pass
0.9622	97	27	27	Pass
0.9936	94	25	26	Pass
1.0250	86	24	27	Pass
1.0564	84	22	26	Pass
1.0878	80	22	27	Pass
1.1192	76	22	28	Pass
1.1505	72	21	29	Pass
1.1819	72	21	29	Pass
1.2133	71	20	28	Pass
1.2447	67	19	28	Pass
1.2761	63	19	30	Pass
1.3074	62	17	27	Pass
1.3388	58	17	29	Pass
1.3702	55	17	30	Pass
1.4016	54	16	29	Pass
1.4330	53	15	28	Pass
1.4643	51	14	27	Pass
1.4957	51	13	25	Pass
1.5271	47	13	27	Pass
1.5585	45	13	28	Pass
1.5899	43	13	30	Pass
1.6212	38	12	31	Pass
1.6526	37	12	32	Pass
1.6840	34	11	32	Pass
1.7154	33	11	33	Pass
1.7468	31	11	35	Pass
1.7782	30	11	36	Pass
1.8095	30	11	36	Pass
1.8409	28	11	39	Pass
1.8723	27	11	40	Pass
1.9037	26	11	42	Pass
1.9351	24	11	45	Pass
1.9664	23	10	43	Pass
1.9978	23	10	43	Pass
2.0292	23	10	43	Pass
2.0606	22	10	45	Pass
2.0920	22	10	45	Pass
2.1233	22	10	45	Pass
2.1547	21	10	47	Pass
2.1861	21	10	47	Pass
2.2175	21	8	38	Pass
2.2489	19	7	36	Pass

2.2802	19	7	36	Pass
2.3116	18	7	38	Pass
2.3430	18	7	38	Pass
2.3744	16	6	37	Pass
2.4058	16	6	37	Pass
2.4372	16	5	31	Pass
2.4685	15	4	26	Pass
2.4999	15	4	26	Pass
2.5313	15	3	20	Pass
2.5627	15	3	20	Pass
2.5941	15	3	20	Pass
2.6254	15	3	20	Pass
2.6568	15	3	20	Pass
2.6882	15	3	20	Pass
2.7196	15	3	20	Pass
2.7510	15	3	20	Pass
2.7823	15	3	20	Pass
2.8137	15	3	20	Pass
2.8451	14	3	21	Pass
2.8765	14	3	21	Pass
2.9079	14	3	21	Pass
2.9392	14	3	21	Pass
2.9706	14	3	21	Pass
3.0020	13	2	15	Pass
3.0334	12	1	8	Pass
3.0648	12	1	8	Pass
3.0962	11	1	9	Pass
3.1275	11	1	9	Pass
3.1589	10	1	10	Pass
3.1903	10	1	10	Pass
3.2217	9	1	11	Pass
3.2531	9	1	11	Pass
3.2844	8	1	12	Pass
3.3158	8	1	12	Pass
3.3472	8	1	12	Pass
3.3786	8	1	12	Pass
3.4100	7	1	14	Pass
3.4413	7	1	14	Pass
3.4727	7	1	14	Pass
3.5041	7	1	14	Pass
3.5355	7	1	14	Pass
3.5669	7	1	14	Pass
3.5982	7	1	14	Pass
3.6296	7	1	14	Pass
3.6610	6	1	16	Pass
3.6924	5	1	20	Pass
3.7238	5	1	20	Pass
3.7552	5	1	20	Pass
3.7865	5	1	20	Pass
3.8179	5	1	20	Pass
3.8493	5	1	20	Pass
3.8807	4	1	25	Pass
3.9121	4	1	25	Pass

Perlnd and Implnd Changes

No changes have been made.

SDHM2011
PROJECT REPORT

Project Name: QC_POC6
Site Name : Quarry Creek
Site Address:
City :
Report Date : 10/5/2012
Gage : OCEANSID
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version : 2012/05/02

Low Flow Threshold for POC 1 : 50 Percent of the 2 Year

High Flow Threshold for POC 1 : 10 year

PREDEVELOPED LAND USE

Name : POC 6
Bypass: No

GroundWater: No

Pervious Land Use	Acres
D,Grass,FLAT(0-5%)	.09
D,Grass,MOD(5-10%)	.16
D,Grass,STEEP(10-20	5.26
Pervious Total	5.51

Impervious Land Use	Acres
Impervious Total	0
Basin Total	5.51

Element Flows To:

Surface	Interflow	Groundwater

MITIGATED LAND USE

Name : POC 6
Bypass: No

GroundWater: No

Pervious Land Use	Acres
D,Grass,FLAT(0-5%)	1.77
D,Grass,STEEP(10-20	.2
Pervious Total	1.97

Impervious Land Use	Acres
IMPERVIOUS-FLAT	4.66
Impervious Total	4.66

Basin Total 6.63

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

Name : Trapezoidal Pond 1
Bottom Length: 150.00 ft.
Bottom Width: 44.00 ft.
Depth : 4 ft.
Volume at riser head : 0.5426 acre-ft.
Side slope 1: 2 To 1
Side slope 2: 2 To 1
Side slope 3: 2 To 1
Side slope 4: 2 To 1
Discharge Structure
Riser Height: 3 ft.
Riser Diameter: 18 in.
Notch Type : Rectangular
Notch Width : 1.170 ft.
Notch Height: 0.235 ft.
Orifice 1 Diameter: 4 in. **Elevation:** 0 ft.

Element Flows To:

Outlet 1	Outlet 2

Pond Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.151	0.000	0.000	0.000
0.0444	0.152	0.006	0.088	0.000
0.0889	0.153	0.013	0.125	0.000
0.1333	0.153	0.020	0.153	0.000
0.1778	0.154	0.027	0.177	0.000
0.2222	0.155	0.034	0.198	0.000
0.2667	0.156	0.041	0.217	0.000
0.3111	0.157	0.048	0.234	0.000

0.3556	0.157	0.055	0.250	0.000
0.4000	0.158	0.062	0.265	0.000
0.4444	0.159	0.069	0.280	0.000
0.4889	0.160	0.076	0.293	0.000
0.5333	0.161	0.083	0.306	0.000
0.5778	0.161	0.090	0.319	0.000
0.6222	0.162	0.097	0.331	0.000
0.6667	0.163	0.105	0.343	0.000
0.7111	0.164	0.112	0.354	0.000
0.7556	0.165	0.119	0.365	0.000
0.8000	0.166	0.127	0.375	0.000
0.8444	0.166	0.134	0.386	0.000
0.8889	0.167	0.141	0.396	0.000
0.9333	0.168	0.149	0.406	0.000
0.9778	0.169	0.156	0.415	0.000
1.0222	0.170	0.164	0.424	0.000
1.0667	0.170	0.171	0.434	0.000
1.1111	0.171	0.179	0.443	0.000
1.1556	0.172	0.187	0.451	0.000
1.2000	0.173	0.194	0.460	0.000
1.2444	0.174	0.202	0.468	0.000
1.2889	0.175	0.210	0.477	0.000
1.3333	0.175	0.218	0.485	0.000
1.3778	0.176	0.226	0.493	0.000
1.4222	0.177	0.233	0.501	0.000
1.4667	0.178	0.241	0.508	0.000
1.5111	0.179	0.249	0.516	0.000
1.5556	0.180	0.257	0.524	0.000
1.6000	0.181	0.265	0.531	0.000
1.6444	0.181	0.273	0.538	0.000
1.6889	0.182	0.281	0.546	0.000
1.7333	0.183	0.290	0.553	0.000
1.7778	0.184	0.298	0.560	0.000
1.8222	0.185	0.306	0.567	0.000
1.8667	0.186	0.314	0.574	0.000
1.9111	0.186	0.322	0.580	0.000
1.9556	0.187	0.331	0.587	0.000
2.0000	0.188	0.339	0.594	0.000
2.0444	0.189	0.348	0.600	0.000
2.0889	0.190	0.356	0.607	0.000
2.1333	0.191	0.365	0.613	0.000
2.1778	0.192	0.373	0.620	0.000
2.2222	0.192	0.382	0.626	0.000
2.2667	0.193	0.390	0.632	0.000
2.3111	0.194	0.399	0.638	0.000
2.3556	0.195	0.407	0.644	0.000
2.4000	0.196	0.416	0.651	0.000
2.4444	0.197	0.425	0.657	0.000
2.4889	0.198	0.434	0.663	0.000
2.5333	0.199	0.443	0.668	0.000
2.5778	0.199	0.451	0.674	0.000
2.6222	0.200	0.460	0.680	0.000
2.6667	0.201	0.469	0.686	0.000
2.7111	0.202	0.478	0.691	0.000
2.7556	0.203	0.487	0.697	0.000
2.8000	0.204	0.496	0.728	0.000
2.8444	0.205	0.505	0.795	0.000

2.8889	0.206	0.515	0.883	0.000
2.9333	0.206	0.524	0.987	0.000
2.9778	0.207	0.533	1.106	0.000
3.0222	0.208	0.542	1.221	0.000
3.0667	0.209	0.551	1.429	0.000
3.1111	0.210	0.561	1.724	0.000
3.1556	0.211	0.570	2.085	0.000
3.2000	0.212	0.580	2.500	0.000
3.2444	0.213	0.589	2.965	0.000
3.2889	0.214	0.599	3.472	0.000
3.3333	0.215	0.608	4.021	0.000
3.3778	0.215	0.618	4.606	0.000
3.4222	0.216	0.627	5.227	0.000
3.4667	0.217	0.637	5.882	0.000
3.5111	0.218	0.647	6.568	0.000
3.5556	0.219	0.656	7.284	0.000
3.6000	0.220	0.666	8.029	0.000
3.6444	0.221	0.676	8.802	0.000
3.6889	0.222	0.686	9.602	0.000
3.7333	0.223	0.696	10.42	0.000
3.7778	0.224	0.706	11.28	0.000
3.8222	0.225	0.716	12.15	0.000
3.8667	0.225	0.726	13.05	0.000
3.9111	0.226	0.736	13.97	0.000
3.9556	0.227	0.746	14.92	0.000
4.0000	0.228	0.756	15.89	0.000
4.0444	0.229	0.766	16.88	0.000

ANALYSIS RESULTS

Predeveloped Landuse Totals for POC #1
Total Pervious Area : 5.51
Total Impervious Area : 0

Mitigated Landuse Totals for POC #1
Total Pervious Area : 1.97
Total Impervious Area : 4.66

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	1.228222
5 year	2.386327
10 year	3.074145
25 year	3.451719

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.625717
5 year	0.869684
10 year	1.744065

25 year 2.469662

POC #1
The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.6141	120	126	104	Pass
0.6390	111	99	89	Pass
0.6638	106	72	67	Pass
0.6887	100	44	44	Pass
0.7135	98	38	38	Pass
0.7384	95	33	34	Pass
0.7632	89	28	31	Pass
0.7881	86	25	29	Pass
0.8129	80	25	31	Pass
0.8378	77	25	32	Pass
0.8626	75	25	33	Pass
0.8874	73	25	34	Pass
0.9123	71	24	33	Pass
0.9371	66	22	33	Pass
0.9620	64	19	29	Pass
0.9868	61	19	31	Pass
1.0117	57	19	33	Pass
1.0365	54	19	35	Pass
1.0614	52	16	30	Pass
1.0862	51	16	31	Pass
1.1111	49	16	32	Pass
1.1359	47	16	34	Pass
1.1608	44	16	36	Pass
1.1856	42	16	38	Pass
1.2105	40	16	40	Pass
1.2353	37	16	43	Pass
1.2602	33	16	48	Pass
1.2850	33	16	48	Pass
1.3099	31	14	45	Pass
1.3347	30	13	43	Pass
1.3596	28	13	46	Pass
1.3844	28	12	42	Pass
1.4093	26	12	46	Pass
1.4341	24	12	50	Pass
1.4590	23	12	52	Pass
1.4838	23	12	52	Pass
1.5087	23	12	52	Pass
1.5335	22	12	54	Pass
1.5584	22	12	54	Pass
1.5832	21	12	57	Pass
1.6081	21	12	57	Pass
1.6329	20	12	60	Pass
1.6578	19	12	63	Pass
1.6826	19	10	52	Pass
1.7075	18	10	55	Pass
1.7323	17	9	52	Pass

1.7572	16	9	56	Pass
1.7820	16	8	50	Pass
1.8069	16	8	50	Pass
1.8317	16	8	50	Pass
1.8566	15	8	53	Pass
1.8814	15	8	53	Pass
1.9063	15	8	53	Pass
1.9311	15	8	53	Pass
1.9559	15	8	53	Pass
1.9808	15	8	53	Pass
2.0056	15	8	53	Pass
2.0305	15	7	46	Pass
2.0553	15	7	46	Pass
2.0802	15	7	46	Pass
2.1050	14	7	50	Pass
2.1299	14	7	50	Pass
2.1547	14	6	42	Pass
2.1796	14	6	42	Pass
2.2044	12	6	50	Pass
2.2293	12	6	50	Pass
2.2541	12	6	50	Pass
2.2790	11	6	54	Pass
2.3038	10	6	60	Pass
2.3287	10	5	50	Pass
2.3535	9	5	55	Pass
2.3784	9	5	55	Pass
2.4032	9	4	44	Pass
2.4281	9	4	44	Pass
2.4529	8	4	50	Pass
2.4778	8	4	50	Pass
2.5026	8	4	50	Pass
2.5275	8	3	37	Pass
2.5523	8	3	37	Pass
2.5772	7	3	42	Pass
2.6020	7	3	42	Pass
2.6269	7	3	42	Pass
2.6517	7	2	28	Pass
2.6766	6	2	33	Pass
2.7014	6	2	33	Pass
2.7263	6	2	33	Pass
2.7511	6	2	33	Pass
2.7760	6	2	33	Pass
2.8008	5	2	40	Pass
2.8257	5	2	40	Pass
2.8505	5	2	40	Pass
2.8754	5	2	40	Pass
2.9002	5	2	40	Pass
2.9251	5	2	40	Pass
2.9499	5	2	40	Pass
2.9747	5	2	40	Pass
2.9996	5	2	40	Pass
3.0244	5	2	40	Pass
3.0493	5	1	20	Pass
3.0741	4	1	25	Pass

Perlnd and Implnd Changes

No changes have been made.

Quarry Creek
Land Use Combination Parameters - Pre-project

J-16483
10-19-2011
Revised 12-20-2011
Revised 3-13-2012

POC	Land_Use	Slope (%)	Soil Group	Acres	Percent Impervious	Impervious Area (ac)	Pervious Area (ac)
1	FRE	0% - 5%	D	0.56	0.95	0.53	0.03
1	FRE	05% - 10%	D	0.57	0.95	0.54	0.03
1	FRE	10% and greater	D	0.06	0.95	0.06	0.00
1	HEA	0% - 5%	A	4.62	0.15	0.69	3.93
1	HEA	0% - 5%	D	1.32	0.15	0.20	1.12
1	HEA	05% - 10%	A	0.13	0.15	0.02	0.11
1	HEA	05% - 10%	D	0.65	0.15	0.10	0.55
1	HEA	10% and greater	A	1.50	0.15	0.22	1.27
1	HEA	10% and greater	D	1.22	0.15	0.18	1.04
1	OPE	0% - 5%	A	0.01	0.00	0.00	0.01
1	OPE	0% - 5%	D	0.05	0.00	0.00	0.05
1	OPE	05% - 10%	D	0.03	0.00	0.00	0.03
1	OPE	10% and greater	A	0.03	0.00	0.00	0.03
1	OPE	10% and greater	D	0.19	0.00	0.00	0.19
1	PAR	0% - 5%	A	0.00	0.95	0.00	0.00
1	PAR	0% - 5%	D	0.14	0.95	0.13	0.01
1	PAR	05% - 10%	A	0.01	0.95	0.01	0.00
1	PAR	05% - 10%	D	0.02	0.95	0.02	0.00
1	PAR	10% and greater	A	0.01	0.95	0.01	0.00
1	PAR	10% and greater	D	0.00	0.95	0.00	0.00
1	HEA	0% - 5%	D	0.00	0.15	0.00	0.00
1	HEA	10% and greater	D	0.19	0.15	0.03	0.16
1	OPE	0% - 5%	A	1.04	0.00	0.00	1.04
1	OPE	0% - 5%	D	0.01	0.00	0.00	0.01
1	OPE	05% - 10%	A	0.12	0.00	0.00	0.12
1	OPE	05% - 10%	D	0.01	0.00	0.00	0.01
1	OPE	10% and greater	A	1.27	0.00	0.00	1.27
1	OPE	10% and greater	D	0.51	0.00	0.00	0.51
1	PAR	0% - 5%	A	0.04	0.95	0.04	0.00
1	PAR	05% - 10%	A	0.01	0.95	0.01	0.00
1	PAR	10% and greater	A	0.02	0.95	0.02	0.00
				14.33		**2.82**	**11.51**

Quarry Creek
Land Use Combination Parameters - Pre-project

J-16483
10-19-2011
Revised 12-20-2011
Revised 3-13-2012
Revised 10-5-2012

POC	Slope (%)	Land Use	Soil Group	Acres	Percent Impervious	Impervious Area (ac)	Pervious Area (ac)
3-2	0% - 5%	HEA	A	1.92	0.15	0.29	1.63
3-2	0% - 5%	OPE	A	0.04	0.00	0.00	0.04
3-2	10% and greater	HEA	A	1.12	0.15	0.17	0.96
3-2	10% and greater	OPE	A	0.05	0.00	0.00	0.05
3-2	5% - 10%	HEA	A	0.65	0.15	0.10	0.55
3-2	5% - 10%	OPE	A	0.01	0.00	0.00	0.01
3-2	0% - 5%	HEA	B	0.13	0.15	0.02	0.11
3-2	0% - 5%	OPE	B	0.05	0.00	0.00	0.05
3-2	10% and greater	HEA	B	0.11	0.15	0.02	0.09
3-2	10% and greater	OPE	B	0.06	0.00	0.00	0.06
3-2	5% - 10%	HEA	B	0.07	0.15	0.01	0.06
3-2	5% - 10%	OPE	B	0.00	0.00	0.00	0.00
3-2	0% - 5%	FRE	D	0.00	0.95	0.00	0.00
3-2	0% - 5%	HEA	D	1.86	0.15	0.28	1.58
3-2	0% - 5%	OPE	D	0.15	0.00	0.00	0.15
3-2	10% and greater	FRE	D	0.10	0.95	0.09	0.00
3-2	10% and greater	HEA	D	3.07	0.15	0.46	2.61
3-2	10% and greater	OPE	D	1.49	0.00	0.00	1.49
3-2	5% - 10%	FRE	D	0.03	0.95	0.03	0.00
3-2	5% - 10%	HEA	D	1.66	0.15	0.25	1.41
3-2	5% - 10%	OPE	D	0.36	0.00	0.00	0.36
				12.92		**1.71**	**11.21**

POC	Slope (%)	Land Use	Soil Group	Acres	Percent Impervious	Impervious Area (ac)	Pervious Area (ac)
3-3	0% - 5%	HEA	A	0.91	0.15	0.14	0.77
3-3	0% - 5%	PAR	A	0.06	0.95	0.05	0.00
3-3	10% and greater	HEA	A	2.02	0.15	0.30	1.71
3-3	10% and greater	PAR	A	0.10	0.95	0.09	0.00
3-3	5% - 10%	HEA	A	1.07	0.15	0.16	0.91
3-3	5% - 10%	PAR	A	0.01	0.95	0.01	0.00
3-3	0% - 5%	HEA	D	1.01	0.15	0.15	0.86
3-3	10% and greater	HEA	D	1.25	0.15	0.19	1.07
3-3	5% - 10%	HEA	D	0.37	0.15	0.06	0.32
				6.79		**1.15**	**5.65**

Quarry Creek
Land Use Combination Parameters - Pre-project

J-16483
10-19-2011
Revised 12-20-2011
Revised 3-13-2012

POC	Land_Use	Slope (%)	Soil Group	Acres	Percent Impervious	Impervious Area (ac)	Pervious Area (ac)
3-7	HEA	0% - 5%	A	1.33	0.15	0.20	1.13
3-7	HEA	0% - 5%	D	0.00	0.15	0.00	0.00
3-7	HEA	05% - 10%	A	0.01	0.15	0.00	0.01
3-7	HEA	10% and greater	A	0.41	0.15	0.06	0.35
3-7	HEA	10% and greater	D	0.02	0.15	0.00	0.02
3-7	OPE	0% - 5%	A	0.01	0.00	0.00	0.01
3-7	OPE	10% and greater	A	0.06	0.00	0.00	0.06
3-7	PAR	0% - 5%	A	0.07	0.95	0.06	0.00
3-7	PAR	05% - 10%	A	0.03	0.95	0.03	0.00
3-7	PAR	10% and greater	A	0.07	0.95	0.06	0.00
				2.01		**0.42**	**1.58**

POC	Land_Use	Slope (%)	Soil Group	Acres	Percent Impervious	Impervious Area (ac)	Pervious Area (ac)
4	HEA	0% - 5%	A	0.57	0.15	0.09	0.49
4	HEA	0% - 5%	B	2.48	0.15	0.37	2.11
4	HEA	0% - 5%	D	3.90	0.15	0.58	3.31
4	HEA	05% - 10%	B	0.45	0.15	0.07	0.38
4	HEA	05% - 10%	D	0.03	0.15	0.00	0.03
4	HEA	10% and greater	A	0.00	0.15	0.00	0.00
4	HEA	10% and greater	B	0.43	0.15	0.06	0.37
4	HEA	10% and greater	D	0.73	0.15	0.11	0.62
4	OPE	0% - 5%	B	0.57	0.00	0.00	0.57
4	OPE	0% - 5%	D	0.68	0.00	0.00	0.68
4	OPE	05% - 10%	B	0.22	0.00	0.00	0.22
4	OPE	05% - 10%	D	0.32	0.00	0.00	0.32
4	OPE	10% and greater	B	0.17	0.00	0.00	0.17
4	OPE	10% and greater	D	3.93	0.00	0.00	3.93
4	PAR	0% - 5%	A	0.59	0.95	0.56	0.03
4	PAR	0% - 5%	C	0.02	0.95	0.01	0.00
4	PAR	05% - 10%	A	0.22	0.95	0.21	0.01
4	PAR	05% - 10%	C	0.00	0.95	0.00	0.00
4	PAR	10% and greater	A	0.03	0.95	0.03	0.00
4	VAC	0% - 5%	B	0.34	0.00	0.00	0.34
4	VAC	0% - 5%	D	0.63	0.00	0.00	0.63
4	VAC	05% - 10%	B	0.33	0.00	0.00	0.33
4	VAC	05% - 10%	D	1.04	0.00	0.00	1.04
4	VAC	10% and greater	B	0.52	0.00	0.00	0.52
4	VAC	10% and greater	D	8.17	0.00	0.00	8.17
				26.38		**2.10**	**24.28**

Quarry Creek
Land Use Combination Parameters - Pre-project

J-16483
10-19-2011
Revised 12-20-2011
Revised 3-13-2012
Revised 10-5-2012

POC	Slope (%)	Land Use	Soil Group	Acres	Percent Impervious	Impervious Area (ac)	Pervious Area (ac)
5	0% - 5%	VAC	B	0.00	0.00	0.00	0.00
5	0% - 5%	OPE	D	0.00	0.00	0.00	0.00
5	0% - 5%	VAC	D	0.49	0.00	0.00	0.49
5	10% and greater	OPE	D	0.07	0.00	0.00	0.07
5	10% and greater	VAC	D	6.04	0.00	0.00	6.04
5	5% - 10%	OPE	D	0.07	0.00	0.00	0.07
5	5% - 10%	VAC	D	0.98	0.00	0.00	0.98
				7.66		**0.00**	**7.66**

POC	Slope (%)	Land Use	Soil Group	Acres	Percent Impervious	Impervious Area (ac)	Pervious Area (ac)
6	0% - 5%	OPE	D	0.00	0.00	0.00	0.00
6	0% - 5%	VAC	D	0.09	0.00	0.00	0.09
6	10% and greater	OPE	D	0.11	0.00	0.00	0.11
6	10% and greater	VAC	D	5.14	0.00	0.00	5.14
6	5% - 10%	OPE	D	0.04	0.00	0.00	0.04
6	5% - 10%	VAC	D	0.12	0.00	0.00	0.12
				5.50		**0.00**	**5.50**

Quarry Creek
Land Use Combination Parameters - Post-project

J-16483
10-19-2011
Revised 12-20-2011
Revised 3-13-2012

POC	Land_Use	Slope (%)	Soil Group	Acres	Percent Impervious	Impervious Area (ac)	Pervious Area (ac)
1	street	0% - 5%	D	1.78	0.95	1.69	0.09
1	lot	0% - 5%	A	5.23	0.85	4.44	0.78
1	lot	0% - 5%	D	1.24	0.85	1.05	0.19
1	slope	10% and greater	A	0.60	0.00	0.00	0.60
1	slope	10% and greater	D	0.88	0.00	0.00	0.88
1	lot	0% - 5%	A	1.09	0.10	0.11	0.98
1	lot	0% - 5%	D	0.00	0.10	0.00	0.00
1	slope	10% and greater	A	1.41	0.00	0.00	1.41
1	slope	10% and greater	D	0.72	0.00	0.00	0.72
1	park and ride	0% - 5%	D	0.69	0.95	0.66	0.03
1	street	10% and greater	A	0.48	0.95	0.46	0.02
1	street	10% and greater	D	0.22	0.95	0.21	0.01
				14.33		**8.62**	**5.71**

Quarry Creek
Land Use Combination Parameters - Post-project

J-16483
10-19-2011
Revised 12-20-2011
Revised 3-13-2012
Revised 10-5-2012

POC	Slope (%)	Land Use	Soil Group	Acres	Percent Impervious	Impervious Area (ac)	Pervious Area (ac)
3-2	0% - 5%	lot	A	3.57	0.85	3.04	0.54
3-2	0% - 5%	lot	B	0.10	0.85	0.08	0.01
3-2	0% - 5%	lot	D	4.82	0.85	4.10	0.72
3-2	0% - 5%	park / open space	B	0.04	0.10	0.00	0.03
3-2	0% - 5%	park / open space	D	0.60	0.10	0.06	0.54
3-2	0% - 5%	park and ride	D	0.61	0.95	0.58	0.03
3-2	10% and greater	slope	A	0.10	0.00	0.00	0.10
3-2	10% and greater	slope	D	1.28	0.00	0.00	1.28
3-2	0% - 5%	street	A	0.10	0.95	0.10	0.01
3-2	0% - 5%	street	B	0.30	0.95	0.28	0.01
3-2	0% - 5%	street	D	1.40	0.95	1.33	0.07
				12.92		**9.57**	**3.35**

POC	Slope (%)	Land Use	Soil Group	Acres	Percent Impervious	Impervious Area (ac)	Pervious Area (ac)
3-3	0% - 5%	lot	A	3.50	0.80	2.80	0.70
3-3	0% - 5%	lot	D	2.56	0.80	2.05	0.51
3-3	0% - 5%	park / open space	B	0.38	0.00	0.00	0.38
3-3	0% - 5%	park / open space	D	0.10	0.00	0.00	0.10
3-3	10% and greater	slope	A	0.66	0.00	0.00	0.66
3-3	10% and greater	slope	D	0.08	0.00	0.00	0.08
				7.27		**4.85**	**2.42**

Quarry Creek
Land Use Combination Parameters - Post-project

J-16483
10-19-2011
Revised 12-20-2011
Revised 3-13-2012

POC	Land_Use	Slope (%)	Soil Group	Acres	Percent Impervious	Impervious Area (ac)	Pervious Area (ac)
3-7	community facility	0% - 5%	A	1.46	0.50	0.73	0.73
3-7	community facility	0% - 5%	D	0.00	0.50	0.00	0.00
3-7	slope	10% and greater	A	0.52	0.00	0.00	0.52
3-7	slope	10% and greater	D	0.03	0.00	0.00	0.03
				2.01		**0.73**	**1.28**

POC	Land_Use	Slope (%)	Soil Group	Acres	Percent Impervious	Impervious Area (ac)	Pervious Area (ac)
4	lot	0% - 5%	B	3.99	0.80	3.19	0.80
4	lot	0% - 5%	D	8.01	0.80	6.41	1.60
4	lot	0% - 5%	B	0.10	0.50	0.05	0.05
4	lot	0% - 5%	D	1.04	0.50	0.52	0.52
4	EDB 2-4	0% - 5%	D	1.74	0.10	0.17	1.56
4	slope	10% and greater	D	1.42	0.00	0.00	1.42
4	slope	10% and greater	D	0.10	0.00	0.00	0.10
4	slope	10% and greater	A	0.00	0.00	0.00	0.00
4	slope	10% and greater	D	0.54	0.00	0.00	0.54
4	street	0% - 5%	A	1.42	0.95	1.35	0.07
4	street	0% - 5%	B	1.04	0.95	0.99	0.05
4	street	0% - 5%	C	0.02	0.95	0.02	0.00
4	street	0% - 5%	D	7.17	0.95	6.81	0.36
				26.57		**19.51**	**7.06**

Quarry Creek
Land Use Combination Parameters - Post-project

J-16483
10-19-2011
Revised 12-20-2011
Revised 3-13-2012
Revised 10-5-2012

POC	Slope (%)	Land Use	Soil Group	Acres	Percent Impervious	Impervious Area (ac)	Pervious Area (ac)
5	0% - 5%	lot	D	5.92	0.80	4.73	1.18
				5.92		**4.73**	**1.18**

POC	Slope (%)	Land Use	Soil Group	Acres	Percent Impervious	Impervious Area (ac)	Pervious Area (ac)
6	0% - 5%	lot	B	0.00	0.80	0.00	0.00
6	0% - 5%	lot	D	5.74	0.80	4.59	1.15
6	10% and greater	slope	D	0.20	0.00	0.00	0.20
6	0% - 5%	community facility	D	0.69	0.10	0.07	0.62
				6.63		**4.66**	**1.97**

Path: W:\16483\GIS\16483 Pre Soils 2012 1004.mxd

RICK ENGINEERING COMPANY

Scale in Feet
0 300 600
North

Date of Exhibit: October 18, 2011
Revised: October 5, 2012
Eagle Aerial Image: March, 2009

Quarry Creek

Pre-Project Hydrologic Soils Group Information

Legend

Pre Project Drainage Basins

Point of Compliance

Slopes

0% - 5%

5% - 10%

10% and greater

RHO AGUA HEDIONDA DR

LILE ST

PORT CR

VISTA WY

78

HAYMAR DR

POC 1

POC 3-2

POC 4

POC 3-3/3-7

MARRON RD

POC 6

POC 5

MILFORD PL

SEABURY ST

HASTINGS DR

TAMARACK AV

Path: W:\16483\GIS\16483_Pre_Slope_2012_1004.mxd

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Scale in Feet

0 300 600

North

Date of Exhibit: October 18, 2011
Revised: October 5, 2012
Eagle Aerial Image: March, 2009

Quarry Creek

Pre-Project Slope Information

Legend

- Point of Compliance
- Pre Project Drainage Basins

Land Use

- Roadway
- Industrial / Mining
- Open Space
- Paved
- Vacant

RHO AGUA HEDIONDA DR
LILE ST
PORT CR
VISTA WY
78
HAYMAR DR
Drainage Basin 1
Drainage Basin 3-2
POC 1
POC 3-2
POC 4
POC 3-3/3-7
Drainage Basin 3-3
MARRON RD
Drainage Basin 3-7
Drainage Basin 4
Drainage Basin 6
POC 6
Drainage Basin 5
POC 5
MILFORD PL
SEABURY ST
HASTINGS DR
TAMARACK AV

Path: W:\16483\GIS\16483_Pre_LandUse_2012_1004.mxd

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Scale in Feet
0 300 600
North

Date of Exhibit: October 18, 2011
Revised: October 5, 2012
Eagle Aerial Image: March, 2009

Quarry Creek

Pre-Project Land Use Information

Path: W:\16483\GIS\16483_Post_Soils_2012_1004.mxd

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Scale in Feet
0 300 600
North

Date of Exhibit: October 18, 2012
Revised: October 4, 2012
Eagle Aerial Image: March, 2009

Quarry Creek

Post-Project Hydrologic Soils Group Information

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Scale in Feet
0 300 600
North

Date of Exhibit: October 18, 2011
Revised: October 4, 2012
Eagle Aerial Image: March, 2009

Quarry Creek

Post-Project Slope Information

Legend

- Post Project Basins
- Point of Compliance

Landuse

- Community Facility
- Lot
- Park / Open Space
- Park and Ride
- Slope
- Street

RHO AGUA HEDIONDA DR
LILE ST
PORT CR
VISTA WY
HAYMAR DR
78
MARRON RD
SEABURY ST
MILFORD PL
HASTINGS DR
THAMES WY
TAMARACK AV

lot 1
lot 1
lot 1 park
lot 1 park
lot 1
offsite
lot 6
lot 6
lot 2
lot 2
lot 11
park/open space
street 2
street 3
POC 1
POC 2
POC 3-2
POC 3-3/3-7
POC 4
POC 5
POC 6
lot 3
lot 3
lot 8
park/open space
slope 4
lot 7
lot 7
lot 9
park/open space
street 1
lot 4
lot 4
lot 4
slope
slope 1
lot 10
lot 5

Path: W:\16483\GIS\16483 Post LandUse 2012 1004.mxd

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Scale in Feet
0 300 600
North

Date of Exhibit: October 18, 2011
Revised: October 5, 2012
Eagle Aerial Image: March, 2009

Quarry Creek

Post-Project Land Use Information

Appendix E

DMA/IMP/BMP Exhibit
for
Quarry Creek

Legend

- Extended Detention Basin
- Proposed Grading
- Drainage Basin 1 - 14.3 ac.
- Drainage Basin 3-2 - 12.9 ac.
- Drainage Basin 3-3 - 7.3 ac.
- Drainage Basin 4 - 26.6 ac.
- Drainage Basin 3-7 - 2.0 ac.
- Drainage Basin 5 - 5.9 ac.
- Drainage Basin 6 - 6.6 ac.

Lot	% Impervious
1	85
2	85
3	80
4	80
5	80
6	95
7	50
8	50
9	10
10	10
11	10

POC	Extended Detention Basin	Q Thershold (cfs)	BL (f)	BW (f)	10-Yr Volume (ac-f)	Riser Size Ht x Diam (f x)	Orifice Diam (in)
POC 1	EDB 1	$0.5Q_2$	385	35	1.06	3 x 1.5	6
POC 3-2	EDB 3-2	$0.5Q_2$	488	25	1.2	3 x 1.5	5.5
POC 3-3	EDB 3-3	$0.5Q_2$	475	13	0.7	3 x 1.5	4
POC 3-7	EDB 3-7	$0.5Q_2$	28	28	0.1	3 x 1.5	2
POC 4	EDB 4	$0.5Q_2$	540	40	2.4	4 x 1.5	7.5
POC 5	EDB 5	$0.5Q_2$	380	30	0.5	1.5 x 1.5	5
POC 6	EDB 6	$0.5Q_2$	150	44	0.6	3 x 1.5	4

Path: W:\16483\GIS\16483 SWMP Map 11x17 2012 1005.mxd

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Scale in Feet: 0 300 600 — North

Date of Exhibit: October 18, 2011
Revised: October 05, 2012
Eagle Aerial Image: March, 2009

Quarry Creek

Storm Water Management Plan Exhibit